RECOMMENDATION TO NAESB EXECUTIVE COMMITTEE

For Quadrant: **Wholesale Electric Quadrant**
Requesters: **Smart Grid Interoperability Panel**
Request No.: **2010 WEQ Annual Plan Item 6(c)(ii)**
Request Title: **Phase Two Requirements Specification for Wholesale Standard DR Signals – for NIST PAP09**

1. RECOMMENDED ACTION:

X	Accept as requested
X	Accept as modified below
	Decline

EFFECT OF EC VOTE TO ACCEPT RECOMMENDED ACTION:

X	Change to Existing Practice
	Status Quo

2. TYPE OF DEVELOPMENT/MAINTENANCE

Per Request:		**Per Recommendation:**	
	Initiation		Initiation
X	Modification	X	Modification
	Interpretation		Interpretation
	Withdrawal		Withdrawal
X	Principle	X	Principle
X	Definition	X	Definition
X	Business Practice Standard	X	Business Practice Standard
	Document		Document
	Data Element		Data Element
	Code Value		Code Value
	X12 Implementation Guide		X12 Implementation Guide
	Business Process Documentation		Business Process Documentation

3. RECOMMENDATION

SUMMARY:

The business activity diagrams and use cases presented in these Business Practice Standards illustrate the standard interactions between a System Operator and various Market Participants for the administration and deployment of demand response resources in organized wholesale electric markets.

RECOMMENDED STANDARDS:

In response to NIST's Priority Action Plan 9, this recommendation contains draft requirements specifications, in the form of business activity diagrams, use cases and data requirements for each interaction, to support the standardization of the information exchanged during interactions between the System Operator and various Market Participants for the administration and deployment of demand response resources in organized wholesale electric markets. Common terminology from the NAESB Measurement and Verification Standards for Demand Response has been incorporated into the development of the business activity diagrams and use cases. As a result of the development of these Business Practice Standards, a standard set of actors

and additional terminology will expand the existing NAESB documentation of associated terms and definitions for demand response.

WEQ-018

RECOMMENDED STANDARDS:

Executive Summary

Specifications for Wholesale Standard Demand Response Signals

The following addresses the business objectives and context for standardizing signals for DR and DER as part of the Smart Grid implementation, which is called for by NIST PAP 09.

The business activity diagrams and use cases contained in this Business Practice Standard address the requirements for standardizing the information exchanged during interactions between the System Operator and various Market Participants for the administration and deployment of demand response resources in organized wholesale electric markets. To maintain consistency a master list of data elements and a common set of actors, terms and definitions have been adopted.

The following describes the end-to-end business activity diagrams relating to the wholesale market interactions between the System Operator (SO) and various Market Participants common to all ISOs/RTOs that offer opportunities for demand resources to participate in organized wholesale electric markets.

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Introduction

Specifications for Wholesale Standard Demand Response Signals

Purpose:

The purpose of the following is to provide standards developers with a context for understanding the range of interactions between wholesale electricity market System Operators and Market Participants across the various electricity systems and jurisdictions in the United States of America with some overlaps to Canada. A major objective in producing these Business Practice Standards is to emphasize the importance of interoperability at all levels of the GWAC interoperability framework.

The use cases included in these Business Practice Standards are not to be required or exhaustive and are provided for clarification purposes.

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Scope: There are certain principles and boundaries that have been established. These include:

1. Demand Response practices must be consistent with NERC and applicable regional reliability authority requirements.
2. All involved entities are registered through the applicable ISO/RTO market participant registration process, which may include credit checks. However, the specifics related to the business processes associated with Market Participant registration are not documented in these requirements.
3. Settlement input parameters are defined as an output to the measurement and performance business process. However, specific business processes associated with settlements are not documented in these requirements.
4. Intra-system operator information exchanges and specific market rules, calculations, algorithms, and Performance Evaluation models are excluded.
5. Planning functions are not documented in these requirements. This includes, but is not limited to, long-term load forecasting and transmission planning.
6. Capacity auctions, awards processes, and resource certification are not documented in these requirements.
7. References in these Recommendations to “Dispatch”, “Markets”, and “Reliability”, are made relative to Demand Response and apply to Demand Response resources only, not to Generation resources.
8. Compliance standards for Demand Response resources are determined by the market rules or other Governing Documents of the respective System Operator and are specific to the product or service and the reliability need being addressed.

Business Practice Standards

018-1 Specifications for Wholesale Standard Demand Response Signals

The following describes the wholesale market business activity diagram and provides the necessary business context and reference architecture for use cases between the System Operator and Market Participant.

018-1.1 Conventions

- Glossary terms are capitalized.
- Implementation does not require every interaction shown in the business activity diagrams.

018-2 ACTORS

The actors listed in the table below are specific to this recommendation and are a subset of the actors and related objects defined in WEQ-000. Details on the relationships between the actors and related objects are further defined in Appendix A.

Table 1 - Actor Roles

Term	Actor ID[3]
Designated Dispatch Entity	3.4
Load Serving Entity	3.2
Meter Authority	3.6
Scheduling Entity	3.3
Service Provider	3.1
System Operator	2.1
Transmission/Distribution Service Provider	3.5

[3] The Actor ID shown in the table refers to the item number of the corresponding actor or related object in the Entity-Relationship Diagram provided in Appendix A. Definitions of the actors and related objects are included in WEQ-000.

018-1.3 USE CASE OVERVIEW

The use cases presented in these Business Practice Standards represent a combination of three dimensions of demand response participation in wholesale markets: product, deployment, and performance evaluation method. As shown in the table below, product and deployment dimensions are identified by a single alphabetic character and performance evaluation methods are indicated by a numeric identifier; each character is separated by a dash (-). For example, use case E-R-1 refers to the use case for the energy (economic) product with a resource-specific deployment and performance evaluated using a Baseline.

The use cases included in this Business Practice Standard are not to be required or exhaustive and are provided for clarification purposes.

Table 2 - Use Case Dimensions

Product	
Energy (Economic)	E
Energy (Reliability)	R
Capacity	C
Reserve	V
Regulation	G
Deployment	
Bulk	B
Resource	R
Self	S
Performance Evaluation	
Baseline	1
MB/MA	2
MBL	3
MGO	4

A sample of the use case list is shown in the table below. Appendix B contains the complete list of valid use case combinations.

Table 3 - Sample Use Case List

Use Case	Product	Deployment	Performance Evaluation
E-R-1	Energy (Economic)	Resource	Baseline
E-R-2	Energy (Economic)	Resource	MB/MA
E-R-3	Energy (Economic)	Resource	MBL
E-R-4	Energy (Economic)	Resource	MGO
E-S-1	Energy (Economic)	Self	Baseline
E-S-2	Energy (Economic)	Self	MB/MA
E-S-3	Energy (Economic)	Self	MBL
E-S-4	Energy (Economic)	Self	MGO

The Figure 1 illustrates the business activity diagrams for use cases combinations that are considered to be representative of the types of demand response in wholesale electricity markets today. Each business activity diagram description includes a table of the use cases to which the business activity diagram applies, followed by the specific data elements that are exchanged in each numbered interaction shown in the business activity diagram.

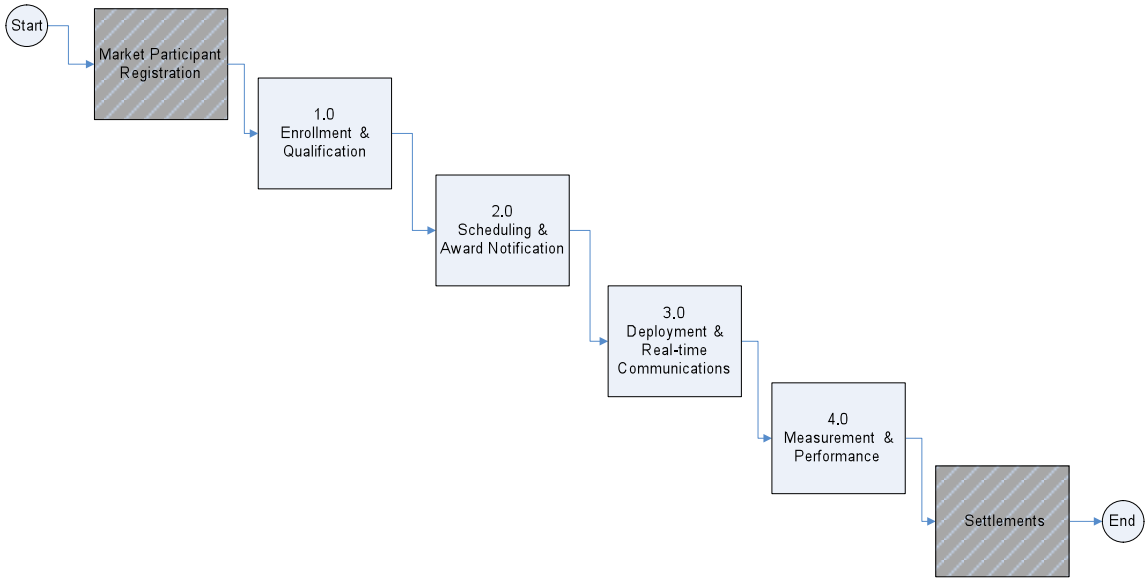
The wholesale Demand Response end-to-end business activity diagram for the interactions between the SO and the Service Provider SP is comprised of four major functions:

- 1.0 Enrollment & Qualification,
- 2.0 Scheduling & Award Notification,
- 3.0 Deployment & Real-Time Communications,
- 4.0 Measurement & Performance.

Two additional activities are shown in the high-level business process flow, but are considered outside the scope of what is required for the interactions flow for demand response:

- Market Participant Registration
- Settlements

Figure 1 - Demand Response



Business activity diagrams are numbered using the sequence shown in Figure 1. If a business process is further specified, the second position in the number sequence indicates this specification, as in 2.1 – Scheduling and Award Notification – Economic and 2.2 – Scheduling and Award Notification – Reliability.

Interactions between the System Operator and the Market Participant are numbered for each business activity diagram. To continue with the example above, 2.1.1 – Offer Parameters, is the first interaction between the System Operator and Market Participant in the business activity diagram 2.1 – Scheduling and Award Notification – Economic.

A table containing the data elements used in the interactions of the business activity diagram is shown. The numbers of the interactions in the table correspond to the numbered interactions in the business activity diagram. Cells showing an “M” (mandatory) are data elements that must contain some value when included in the interaction message. Cells showing an “O” (optional) are data elements that may be left blank if not used in a given interaction.

018-1.4 SPECIFIC USE CASES

018-1.4.1 Enrollment and Qualification

Overview: The Enrollment and Qualification process documents the steps required to enroll a Resource in a wholesale demand response program.

Use Cases: All valid use cases defined in these Business Practice Standards (see Figure 2)

- The process begins when the SP submits an enrollment request to the SO.
- The SO processes the enrollment request, which may include interactions with the TDSP, LSE, MA and/or SE.
- The SO evaluates the enrollment request, which may include verification information from the TDSP, LSE, MA and/or SE.
- The result of the evaluation is the approval or rejection of the enrollment request.
    - If the enrollment request has been rejected, the SO sends information to the SP, indicating the rejection details.
    - If the enrollment request has been approved, a determination is made by the SO as to whether qualification of the Resource's capability is required prior to final approval.
        - If no qualification is required, the SO sends information to the SP, indicating the approval of the enrollment.
        - If qualification is required, the SO coordinates the qualification procedure with the SP.
            - If the Resource has failed to qualify, the SO sends information to the SP, indicating the qualification rejection details.
            - If the Resource achieves qualification, the SO sends information to the SP and enrollment is finalized.
- At the end of the Enrollment and Qualification process, the SO finalizes enrollment, notifies the SP and may also notify the TDSP, LSE, MA and/or SE.

Activity Diagram and Data Flow:

Figure 2 - Enrollment and Qualification

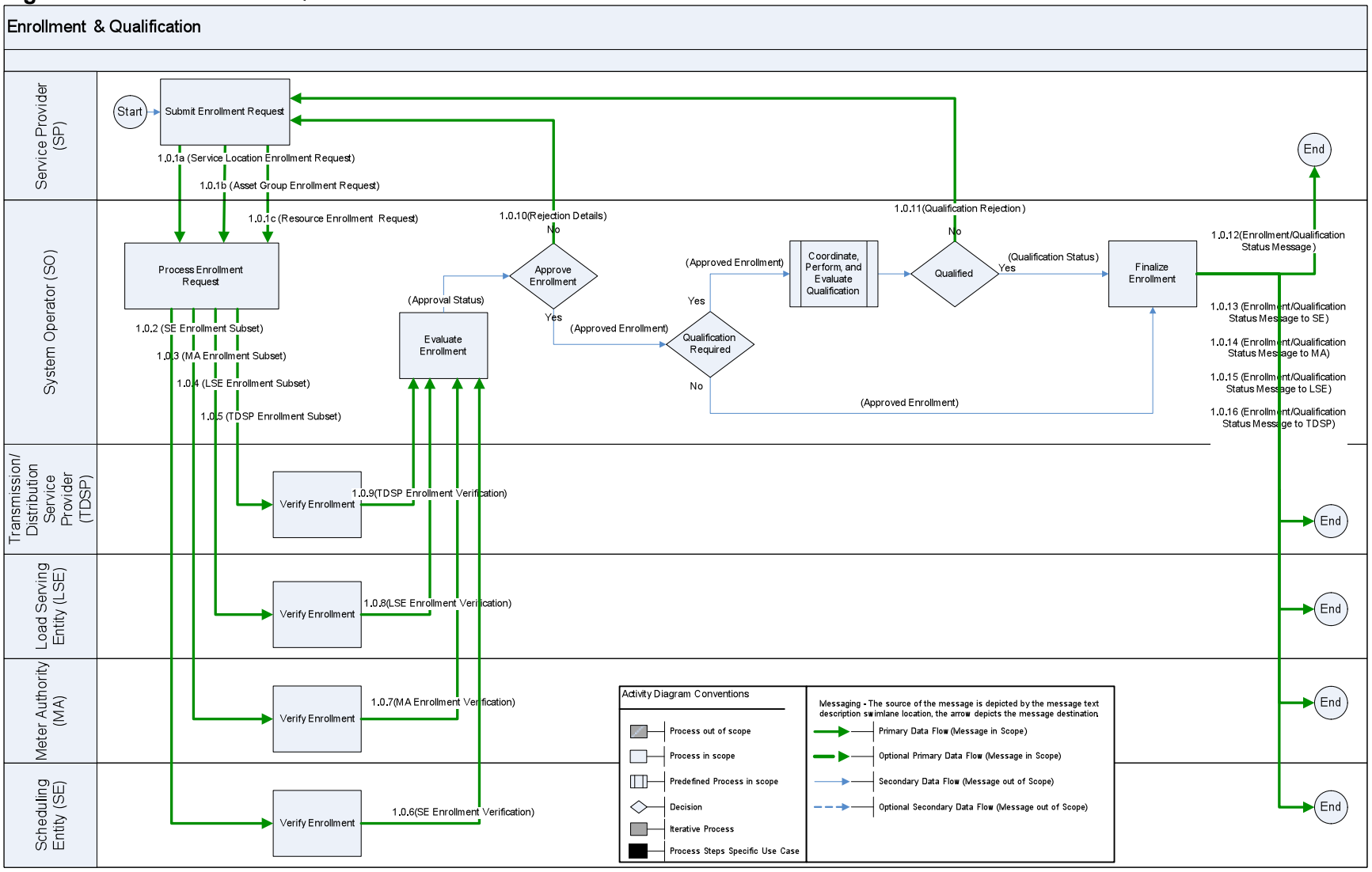


Table 4. Data Requirements by Interaction Number 1.0.1a through 1.0.9: Enrollment and Qualification

			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			Short Description											
0		**Common**												
0	**10**	**Submittal Date**	Timestamp for the sender's use	O	O	M	O	O	O	O				
0	**11**	**Submitted By**	User ID of submitter	O	O	M	O	O	O	O				
0	**12**	**Submitted Error**	ID of submission error detected	O	O	M	O	O	O	O				
0	**13**	**Rejection Code Type**	Type of rejection message											
0	**14**	**Rejection Code Value**	Code referring to the reason for a rejection message											
0	**20**	**NERC CIP Security - Availability**	CIP Security Classification for Availability	M	M	M	M	M	M	M	M	M	M	M
0	**21**	**NERC CIP Security - Confidentiality**	CIP Security Classification for Confidentiality	M	M	M	M	M	M	M	M	M	M	M
0	**22**	**NERC CIP Security - Integrity**	CIP Security Classification for Integrity	M	M	M	M	M	M	M	M	M	M	M
1		**General Asset/Resource**												

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			Process	**1.0 Enrollment & Qualification**											
			From	SP			SO				SE	MA	LSE	TDSP	
			To	SO			SE	MA	LSE	TDSP	SO				
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9	
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification	
Element			**Short Description**												
1	**10**	**Service Location ID**	Identifier assigned to the Service Location	M	M	M	M	M	M	M	M	M	M	M	
1	**11**	**Service Location Name**	Name of the Service Location	O	O	M	M	O	O	O	M	O	O	M	
1	**12**	**Asset ID**	The unique identifier of the asset	O	O	O	O	O	O	O	O	O	O	O	
1	**13**	**Asset Name**	The name of the asset	O	O	O	O	O	O	O	O	O	O	O	
1	**20**	**Resource ID**	Identifier assigned to the Resource	M	M	M	M	M	M	M	M	M	M	M	
1	**21**	**Resource Name**	Name of the Resource	O	O	M	M	O	O	O	M	O	O	O	
1	**30**	**Asset Group ID**	The identifier of a group of assets	M	M	M	M	M	M	M					
1	**31**	**Asset Group Name**	Name of the aggregated group of assets	M	M	M	M	M	M	M					
1	**40**	**GenEMSID**	Alias or point Identifier assigned to the Resource			M									
1	**41**	**GenBillingID**	Billing Identifier assigned to the Resource			M									

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			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
1	**50**	**Business Segment**	NAICS code of the Service Location	O	O	O								
1	**51**	**Batch Load Flag**	Flag set if the Resource is a Batch Load	O	O	O								
1	**991**	**General Resource Comments**	General comments associated with the Resource	O	O	O	O	O	O	O				
2		**Location**												
2	**10**	**Address1**	Address line 1	M	M	M	M	M	M	M	M			M
2	**11**	**Address2**	Address line 2	O	O	O	O	O	O	O	O			O
2	**12**	**City**	City	M	M	M	M	M	M	M	M			M
2	**13**	**Service Location State/Province**	State or Province two-letter code	M	M	M	M	M	M	M	M			M
2	**14**	**Service Location Zip/Postal Code**	Zip or Postal Code	M	M	M	M	M	M	M	M			M
2	**15**	**Service Location Country**	Country	M	M	M	M	M	M	M	M			M
2	**20**	**GPS Coordinates**	Latitide and longitude	O	O	O								

			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			Short Description											
2	21	Weather Station	Weather Station code associated with the Service Location	M	M	M	O	O						
2	22	TimeZoneName	Name of the Time Zone in which the Service Location is located	O	O	O								
2	30	Zone ID	Identifier assigned to the Zone in which the Service Location is located	M	M	M	M	M	M	M				
2	31	Zone	Name of the Zone in which the Service Location is located	M	M	M	O	O	O	O				
2	32	Zone Type	Type of Zone	M	M	M	O	O	O	O				
2	40	Electrical Node ID	Identifier assigned to the Electrical Node at which the Service Location is connected	M	M	M	M	M	O	M				
2	41	Electrical Node Name	Name of the Electrical Node at which the Service Location is connected	M	M	M	O	O	O	O				M

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			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
2	**42**	**Electrical Node Type**	Type of Electrical Node at which the Service Location is attached	M	M	M	M	M	M	M				M
2	**43**	**PNode**	Name of the Price Node associated with the Service Location	O	O	O	O	O	O	O				
2	**44**	**PNode ID**	Identifier assigned to the Price Node associated with the Service Location	M	M	M	M	M	M	M	M			M
2	**50**	**Competitive Choice Area**	Flag set if the Service Location is in an area with Competitive Choice	O	O	O	O	O	O	O	O			O
2	**51**	**Asset Multiplier**	Number of identical assets within the Service Location	O	O	O								
2	**60**	**NERC Control Area**	The NERC control area of the resource	O	O	O								
2	**71**	**Connection Type**	Additional type of connection associated with the Service Location/Resource	O	O	O								

			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
2	**72**	**Connection Address**	Address associated with the Connection Type	O	O	O								
2	**991**	**Location Comments**	Comments associated with the Service Location	O	O	O	O	O	O	O				
3		**Contact**												
3	**10**	**Contact Type**	Interest code associated with a Contact	M	M	M								
3	**11**	**Contact Priority**	Order in which this Contact should be selected	M	M	M								
3	**12**	**DUNS Number**	DUNS business number	M	M	M								
3	**13**	**Third Party**	Flag set if the Contact is a third-party entity	O	O	O								
3	**20**	**Title**	Title of the Contact	O	O	O								
3	**21**	**First Name**	First Name of the Contact	M	M	M								
3	**22**	**Last Name**	Last Name of the Contact	M	M	M								
3	**23**	**Contact Middle Name**	Middle Name of the Contact	O	O	O								
3	**30**	**Contact Method**	Method of communication with the Contact	M	M	M								

			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			Short Description											
3	31	Contact Address Data	Method-dependent Address of the Contact	M	M	M								
3	32	Contact Method Priority	Order in which a Communication Method should be selected for a Contact	O	O	O								
3	991	Contact Comments	Comments associated with the Contact	O	O	O								
4		Grid Connection												
4	10	Loss Factor Type	Type of Loss Factor	M	M	M	M	M						O
4	11	Loss Factor Value	Loss Factor	M	M	M	M	M						O
4	12	Connect Voltage	Voltage level	M	M	M	O	O	O	O				
4	991	Grid Connection Comments	Comments associated with the Attributes of the Resource	O	O	O								
5		Business Entity Relationships												
5	11	Service Provider ID	Identifier assigned to the Service Provider	M	M	M	M	M			M			

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			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
5	**12**	**Service Provider Name**	Name of the Service Provider	M	M	M	M	M			O			
5	**20**	**Transmission/Distribution Service Provider ID**	Identifier assigned to theTransmission/Distribution Service Provider	M	M	M	M	M			M			
5	**21**	**Transmission/Distribution Service Provider Name**	Name of the Transmission/Distribution Service Provider	M	M	M	M	M			O			M
5	**22**	**Transmission/Distribution Service Provider Account Number**	Transmission/Distribution Service Provider's account number for the Resource	M	M	M	M	M	O	O				O
5	**30**	**Load-Serving Entity ID**	Identifier assigned to the Load-Serving Entity	M	M	M	M	M	O	O				
5	**31**	**Load-Serving Entity Name**	Name of the Load-Serving Entity	M	M	M	M	M	O	O				
5	**40**	**Retail Rate ID**	Identifier assigned to the Retail Rate	M	M	M			O					
5	**41**	**Retail Rate Code**	Code representing the Retail Rate for the Service Location	O	O	O			O				O	
5	**42**	**Retail Rate Name**	Name of the Retail Rate for the Service Location	M	M	M			O				M	

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			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			Short Description											
5	43	**Retail Rate Description**	Description of the Retail Rate	O	O	O			O				O	
5	44	**Retail Rate**	Retail Rate	M	M	M			O				M	
5	50	**Meter Installation Provider ID**	Identifier assigned to the Meter Installation Provider	M	M	M								
5	51	**Meter Installation Provider Name**	Name of the Meter Installation Provider	M	M	M								
5	60	**Meter Authority ID**	Identifier assigned to the Metering Authority	M	M	M	M	M			M			M
5	61	**Meter Authority Name**	Name of the Metering Authority	M	M	M	M	M			O			O
5	70	**Scheduling Entity ID**	Identifier assigned to the Scheduling Entity	M	M	M	M				M			M
5	71	**Scheduling Entity Name**	Name of the Scheduling Entity	M	M	M	M				O			O
5	80	**Designated Dispatch Entity ID**	Idenitifier assigned to the Designated Dispatch Entity	M	M	M	M				M			M
5	81	**Designated Dispatch Entity Name**	Name of the Designated Dispatch Entity	M	M	M	M				O			O

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			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
5	**991**	**External Entity Comments**	Comments associated with the External Entity	O	O	O								
6		**Device and Qualification**												
6	**10**	**Meter Configuration**	Configuration of the Meter at the Service Location	M	M	M	M							
6	**11**	**Parent Meter id**	ID of a Master or Parent Meter	O	O	O	O	O						
6	**20**	**Meter ID**	Identifier assigned to the Meter	M	M	M	M	M	M	M	M			M
6	**21**	**Meter Type**	Type of Meter installed at the Service Location	M	M	M	M							
6	**22**	**Meter Manufacturer**	Manufacturer of the Meter	M	M	M								
6	**221**	**Meter Installation Date**	Date of Installation of the Meter	M	M	M								
6	**222**	**PT Ratio**	Ratio of the Potential Transformer	O	O	O								
6	**223**	**Meter Installer License**	Professional License Number of the Installer of the Meter	O	O	O								

			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			Short Description											
6	224	**Meter Correction Factors**	Device-specific Factors used to adjust for atmospheric changes at the point of installation of the Meter	O	O	O								
6	225	**Meter Test Criteria**	Test Criteria required to qualify the installation of the Meter	M	M	M								
6	226	**Meter Test Frequency**	Frequency of Tests of the Meter	O	O	O								
6	227	**Device QA Plan**	Quality Assurance plan for maintenance and testing of the Meter	M	M	M								
6	228	**Date of Last Meter Test**	Date of Last Test of the Meter	O	O	O								
6	229	**Meter Qualification Date**	Date of Qualification of the Meter by the Metering Authority or System Operator	M	M	M	O	M						
6	2291	**Meter Test Results**	Results of Tests of the Meter	M	M	M								

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			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
6	**2292**	**VEE Compliance**	Compliance standard for Validation, Editing, and Estimation	M	M	M								
6	**2293**	**Measurement Interval**	Interval of time between Measurement readings	M	M	M								
6	**2294**	**ANSI Compliance**	ANSI standard with which the Meter complies	O	O	O								
6	**2295**	**Meter Owner**	Owner of the Meter	M	M	M								O
6	**2296**	**Meter Asset Comments**	Comments associated with the Meter Asset	O	O	O								
6	**23**	**Meter Model**	Model of the Meter	M	M	M								
6	**24**	**Meter Rating**	Load Rating of the Meter	O	O	O								
6	**25**	**Meter Multiplier (kH)**	Multiplier used to convert pulses into power units	M	M	M								
6	**26**	**Meter Accuracy Class**	Accuracy Class of the Meter	M	M	M								
6	**27**	**Meter Loss Compensation**	Line Losses included in the Meter	M	M	M								

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			Process	**1.0 Enrollment & Qualification**											
			From	SP			SO				SE	MA	LSE	TDSP	
			To	SO			SE	MA	LSE	TDSP	SO				
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9	
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification	
Element			**Short Description**												
6	**28**	**Maximum Error**	Error of the Meter, including end-to-end Maximum Error	O	O	O									
6	**29**	**Meter Phase**	Specific Phase information	O	O	O									
6	**291**	**CT Ratio**	Ratio of the Current Transformer	M	M	M									
6	**30**	**Distributed Generator Type**	Type of Distributed Generator	M	M	M									
6	**31**	**Nameplate Rating**	Manufacturer's output rating of the Distributed Generator	M	M	M									
6	**32**	**Distributed Generator Fuel Type**	Type of Fuel consumed by the Distributed Generator	M	M	M									
6	**33**	**Distributed Generator Permit Type**	Type of environmental authorization required to operate the Distributed Generator	M	M	M									
6	**34**	**Distributed Generator Manufacturer**	Manufacturer of the Distributed Generator	O	O	O									

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			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			Short Description											
6	35	**Manufactured Date of the Distributed Generator**	Date of Manufacture of the Distributed Generator	O	O	O								
6	36	**Installation Date of Distributed Generator**	Date of Installation of the Distributed Generator	O	O	O								
6	37	**Generator In-Service Date**	Date the Distributed Generator became operational	M	M	M								
6	38	**Normal Load Rating**	Average load picked up by the Distributed Generator during the applicable performance hours	M	M	M								
6	39	**Distributed Generator Name**	Name of the Distributed Generator	M	M	M								
6	41	**Interconnection Agreement Type**	Type of Interconnection Agreement between the Distributed Generator or Service Location and the TDSP	M	M	M								

			Process	1.0 Enrollment & Qualification									
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
				1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
			Interaction	Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			Short Description											
6	42	Interconnection Limits	Limits associated with the Interconnection of the Distributed Generator or Service Location	M	M	M								
6	43	Capable of Synchronizing to Grid	Flag set if the Service Location is capable of Synchronizing to the Grid	M	M	M								
6	44	Normal Breaker Status	Status of the Breaker for the Service Location under Normal operating conditions	M	M	M								
6	45	Breaker Status During Event	Status of the Breaker for the Service Location during an Emergency Event	O	O	O								
6	46	Wholesale Delivery Point Status	Flag set if the Service Location is metered at the Wholesale level	M	M	M								
6	47	Private Use Network	Flag set if the Resource is an Electric Network connected to the transmission grid	O	O	O								

			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			Short Description											
6	51	**UFR Settings**	Setting of the Under-Frequency Relay	O	O	O								
6	52	**Load Resource Control Device**	Type of Control Device at a Service Location or deployed by a Response Method	M	M	M								
6	991	**Distributed Generator Comments**	Comments associated with the Distributed Generator	O	O	O								
7		**Market/Program Enrollment**												
7	10	**Program ID**	Program Identifier	M	M	M	M	M	M	M	M	M	M	M
7	11	**Program Name**	Name of the Program	O	O	O	O	O	O	O	O	O	O	O
7	12	**Market**	Type of wholesale market	M	M	M	M	M	M	M				
7	13	**Market Product**	Market Product	M	M	M	M	M	M	M	M			M
7	21	**Effective Enrollment Date**	Effective Start Date for the Enrollment	M	M	M	O	O	O	O	M			
7	22	**Enrollment Status**	Status of the Enrollment for the Service Location or Resource	M	M	M	O	O	O	O	M			

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			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
7	**23**	**Resource Type**	Type of Resource	M	M	M	M	M	M	M	M			M
7	**24**	**Resource Qualification Test Date**	Date the Resource demonstrated its ability to deliver a product or service	M	M	M	M				M			O
7	**25**	**Enrollment End Date**	Date of Termination of Enrollment	M	M	M	M	M	M	M	M			O
7	**26**	**Requalification Test Date**	Date the Resource will retest its ability to deliver a product or service	M	M	M	M				M			O
7	**30**	**Lead Time**	Time between the advanced notification and deployment	O	O	O	O	O						
7	**31**	**Day Ahead Flag**	Flag set if the Resource will be participating in the Day-Ahead market	M	M	M	M	M						
7	**32**	**Real Time Flag**	Flag set if the Resource will be participating in the Real-Time market	M	M	M	M	M						
7	**33**	**Self-Schedule Flag**	Flag set if the Resource is Self-Deploying	O	O	O								

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			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
7	**40**	**Response Method Type**	Type of Response Method	M	M	M	O	O	O	O	O			
7	**41**	**Response Method ID**	Identifier assigned to the Response Method	M	M	M	M	M	M	M				
7	**42**	**Response Method Name**	Name of the Response Method	O	O	O	O	O	O	O				
7	**43**	**Response Method Value**	Value of the Response Method	M	M	M	M	O	O	O	M			
7	**44**	**Verified Capability**	Audited Capability	O	O	O	M				M			
7	**45**	**Verified Capability Factor**	Ratio of the Verified Capability to the qualified capability	O	O	O								
7	**50**	**Performance Evaluation Method Type Code**	Code representing the Type of Measurement	M	M	M	M	O			M			
7	**51**	**Performance Evaluation Method**	Method used to Evaluate the Performance of a Resource	O	O	O	O	O						
7	**991**	**Market Enrollment Comments**	Comments associated with the Enrollment	M	M	M	O	O	O	O	O			
8		**Offer Parameters**												

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			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
8	**10**	**Offer Limit Value**	Offer Limit Value	M	M	M	M	O			M			
8	**11**	**Offer Limit Type**	Type of Offer Limit	M	M	M	M	O			M			
8	**12**	**Offer Limit Interval**	Offer Limit Interval	M	M	M	M	O			M			
8	**20**	**Physical Min Gen**	Minimum Operating Level of a Resource	M	M	M	O				O			O
8	**21**	**Min Gen MW**	Minimum MW available for dispatch	M	M	M	O	O			O			O
8	**22**	**MinGenCost**	The cost per hour for each Min Gen MW value.	M	M	M	O	O			O			O
8	**23**	**Ramp Rate Type**	Type of Ramp Rate	M	M	M	M				M			
8	**24**	**Ramp Rate Segment**	Energy of Segment of the Ramp Rate	M	M	M	M				M			
8	**25**	**Ramp Rate Direction**	Direction of the selected Ramp Rate Type and Ramp Rate Segment	M	M	M	M				M			

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			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
8	**26**	**Ramp Rate Value**	Ramp Rate associated with the selected Ramp Rate Type for the selected Ramp Rate Segment and Ramp Rate Direction	M	M	M	M				M			
8	**30**	**Offer Dispatch Type**	Type of Offer	M	M	M								
8	**31**	**Offer Segment MW**	Energy of Segment of the Offer	O	O	M								
8	**32**	**Offer Segment Price**	Price of Segment of the Offer	O	O	M								
8	**33**	**Offer Segment Hour**	Hour of Segment of the Offer	O	O	M								
8	**34**	**Startup Cost**	Cost of starting a response activity	O	O	M								
8	**35**	**Strike Price**	Threshold Price	O	O	M								
8	**36**	**Offer Expiration Date**	Date of Expiration of the Offer	O	O	M								
8	**37**	**Startup Cost Type**	Type of startup cost	M	M	M								
8	**38**	**Offer Commit Status**	Commitment status of offer	M	M	M								

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			From	SP			SO				SE	MA	LSE	TDSP
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			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			Short Description											
8	39	**Offer Dispatch Status**	Dispatch Status of Offer	M	M	M								
8	331	**Offer Price Curve Slope**	Flag to smooth offer segments from step function to slope	M	M	M								
8	332	**StrikePriceType**	Type of strike price	O	O	O								
8	40	**Market Clearing Day**	Market Clearing Day of the Offer	O	O	O	O							
8	41	**Schedule Name**	Name or tag of the Offer	O	O	O	O							
8	42	**Schedule Description**	Description of the Offer	O	O	O	O							
8	43	**Schedule Status**	Status of the Offer	M	M	M	O							
8	50	**Portfolio Name**	Name of an aggregation of Resources for market participation	O	O	O	O							
8	71	**Operational Constraint Type**	Type of operational, schedule or offer constraint	M	M	M								
8	72	**Operational Constraint Interval**	The timeframe over which the constraint type applies.	M	M	M								

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			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
8	**73**	**Operational Constraint Value**	Value of the Constraint Type and Interval	M	M	M								
9		**Energy Market**												
9	**0**	**Instruction ID**		M	M	M								
9	**10**	**Energy Schedule - Start Time**	Start Time of the Energy Schedule											
9	**11**	**Energy Schedule - End Time**	End Time of the Energy Schedule											
9	**12**	**Energy Schedule - Interval Start Time**	Start Time of the Energy Interval within the Energy Schedule											
9	**13**	**Energy Schedule - Cleared MW Interval Value**	The Energy Value of cleared MW for the Time Interval within the Energy Schedule											
9	**14**	**Energy Schedule - Cleared Price**	Awarded Price											
9	**15**	**Schedule ID**		M	M	M								

			Process	1.0 Enrollment & Qualification									
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			Short Description											
9	20	Base Point	Per-interval dispatch instruction											
9	21	Breaker Status	Status of the Breaker for the Resource											
9	22	Output MW	Real Power Output of the Generation Device											
9	23	Output MVAR	Reactive Power Output of the Generation Device											
9	24	DR Bus Load MW	Instantaneous Bus Load of a Demand Resource providing Ancillary Services											
9	27	Set Point	Final dispatch target level											
10		Ancillary Service Market												
10	0	Ancillary Service Instruction ID												
10	10	Ancillary Service Product Type	Type of Ancillary Service product(s) the Resource is enrolling to provide	M	M	M								

			Process	1.0 Enrollment & Qualification									
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			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
10	**11**	**Have Engineering Diagram**	Flag set if One-Line Diagrams have been submitted	O	O	O								
10	**12**	**Ancillary Service Award - Start Time**	Start Time of the ancillary service Award											
10	**13**	**Ancillary Service Award - End Time**	End Time of the ancillary service Award											
10	**14**	**Ancillary Service Award - Interval Start Time**	Start Time of the ancillary service Interval within the ancillary service Award and the ancillary service Value of the Time Interval											
10	**15**	**Ancillary Service Award - Interval Value**	The awarded Value for the Time Interval within the ancillary service Award											
10	**16**	**Ancillary Service Award - Cleared Price**	Awarded Price											
10	**17**	**Ancillary Service Schedule ID**												

			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			Short Description											
10	20	**Ancillary Service Product Qualification Type**	Type of Qualification	M	M	M	M				M			
10	21	**Synchronization Test Date**	Target Date of Test of Synchronization to the grid	O	O	O								
10	22	**Ancillary Service Product Type Qualification Date**	Date of Qualification of the Resource	M	M	M	M				M			
10	23	**Ancillary Service Product Type Qualified**	Type of Ancillary Service Product(s) for which the Resource has Qualified	M	M	M	M				M			
10	24	**Requalification Requirement**	Flag set if Requalification is Required	O	O	O								
10	31	**Reserve Pickup Flag**	Flag set if this is a Reserve Pickup schedule											
10	32	**Regulation Base Point**	Per-interval Regulation dispatch instruction											
10	33	**Base Load MW**	Level of Load at time of dispatch											

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				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
11		**Capacity Market**												
11	**10**	**Capacity Type**	Type of Capacity	M	M	M	O	O						
11	**11**	**Capacity Type description**	Description of the Type of Capacity	O	O	O	O	O						
11	**20**	**Peak Value**	Measurement of Peak	M	M	M	O	O						M
11	**21**	**Peak Type**	Type of measurement of Peak	M	M	M	O	O						M
11	**22**	**Peak Date/Time**	Date and Time of measurement of Peak	M	M	M	O	O						M
11	**23**	**Nominal Capacity**	Nominated load	M	M	M	O	O						
11	**24**	**Qualified Capacity**	Nominal ICAP derated for performance	O	O	O								
11	**30**	**Capacity Obligation Period Type**	Type of Capacity Obligation Time Period within which the Resource is obligated	M	M	M	O	O						

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			Process	1.0 Enrollment & Qualification										
			From	SP			SO				SE	MA	LSE	TDSP
			To	SO			SE	MA	LSE	TDSP	SO			
			Interaction	1.0.1 a	1.0.1 b	1.0.1 c	1.0.2	1.0.3	1.0.4	1.0.5	1.0.6	1.0.7	1.0.8	1.0.9
				Service Location Enrollment	Asset Group Enrollment	Resource Enrollment	SE Version	MA Version	LSE Version	TDSP Version	SE Enrollment Verification	MA Enrollment Verification	LSE Enrollment Verification	TDSP Enrollment Verification
Element			**Short Description**											
11	**31**	**Capacity Obligation Period**	Period of time for which the Capacity Resource is obligated	M	M	M	O	O						
11	**40**	**Minimum Payment Nomination**	Strike price for the economic dispatch of the energy component of the capacity program	O	O	O								
11	**41**	**Capacity Supply Obligation**	Capacity Obligation											
11	**50**	**Capacity Reference ID**	Identifier assigned to the External System award	O	O	O	O	O						
11	**991**	**Capacity Comments**	Comments associated with the Capacity market	O	O	O	O	O						

Table 5. Data Requirements by Interaction Number 1.0.10 through 1.0.16: Enrollment and Qualification

		Process	1.0 Enrollment & Qualification						
		From	SO		SO				
		To	SP		SP	SE	MA	LSE	TDSP
		Interaction	1.0.10 Rejection Details	1.0.11 Qualification Rejection	1.0.12 Qualification Status to SP	1.0.13 Qualification Status to SE	1.0.14 Qualification Status to MA	1.0.15 Qualification Status to LSE	1.0.16 Qualification Status to TDSP
Element		Short Description							
0		**Common**							
0	**10**	**Submittal Date**	Timestamp for the sender's use	O	O	O			O	O
0	**11**	**Submitted By**	User ID of submitter	O	O	O			O	O
0	**12**	**Submitted Error**	ID of submission error detected	O	O	O			O	O
0	**13**	**Rejection Code Type**	Type of rejection message	M	M					
0	**14**	**Rejection Code Value**	Code referring to the reason for a rejection message	M	M					
0	**20**	**NERC CIP Security - Availability**	CIP Security Classification for Availability	M	M	M	M	M	M	M
0	**21**	**NERC CIP Security - Confidentiality**	CIP Security Classification for Confidentiality	M	M	M	M	M	M	M
0	**22**	**NERC CIP Security - Integrity**	CIP Security Classification for Integrity	M	M	M	M	M	M	M
1		**General Asset/Resource**							
1	**10**	**Service Location ID**	Identifier assigned to the Service Location	M	M	M	M	M	M	M

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
1	11	Service Location Name	Name of the Service Location	M	M	M	M	M	M	M
1	12	Asset ID	The unique identifier of the asset	O	O	O	O	O	O	O
1	13	Asset Name	The name of the asset	O	O	O	O	O	O	O
1	20	Resource ID	Identifier assigned to the Resource	M	M	M	M	M	M	M
1	21	Resource Name	Name of the Resource	O	M	M	M	O	O	O
1	30	Asset Group ID	The identifier of a group of assets			O	O	O	O	O
1	31	Asset Group Name	Name of the aggregated group of assets			O	O	O	O	O
1	40	GenEMSID	Alias or point Identifier assigned to the Resource			M				
1	41	GenBillingID	Billing Identifier assigned to the Resource			M				
1	50	Business Segment	NAICS code of the Service Location							
1	51	Batch Load Flag	Flag set if the Resource is a Batch Load			O			O	O

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
			Interaction	1.0.10 Rejection Details	1.0.11 Qualification Rejection	1.0.12 Qualification Status to SP	1.0.13 Qualification Status to SE	1.0.14 Qualification Status to MA	1.0.15 Qualification Status to LSE	1.0.16 Qualification Status to TDSP
Element		**Short Description**								
1	**991**	**General Resource Comments**	General comments associated with the Resource	O	O	O			O	O
2		**Location**								
2	**10**	**Address1**	Address line 1	M	M	O	M		O	O
2	**11**	**Address2**	Address line 2	O	O	O	O		O	O
2	**12**	**City**	City	M	M	O	M		O	O
2	**13**	**Service Location State/Province**	State or Province two-letter code	M	M	O	M		O	O
2	**14**	**Service Location Zip/Postal Code**	Zip or Postal Code	M	M	O	M		O	O
2	**15**	**Service Location Country**	Country	M	M	O	M		O	O
2	**20**	**GPS Coordinates**	Latitide and longitude							
2	**21**	**Weather Station**	Weather Station code associated with the Service Location			O			O	O
2	**22**	**TimeZoneName**	Name of the Time Zone in which the Service Location is located							
2	**30**	**Zone ID**	Identifier assigned to the Zone in which the Service Location is located	M	M	M			M	M

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
2	31	Zone	Name of the Zone in which the Service Location is located	O	O	O			O	O
2	32	Zone Type	Type of Zone	O	O	O			O	O
2	40	Electrical Node ID	Identifier assigned to the Electrical Node at which the Service Location is connected	M		M	M		M	M
2	41	Electrical Node Name	Name of the Electrical Node at which the Service Location is connected	O		O			O	O
2	42	Electrical Node Type	Type of Electrical Node at which the Service Location is attached	O		O			O	O
2	43	PNode	Name of the Price Node associated with the Service Location	O	O	O			O	O
2	44	PNode ID	Identifier assigned to the Price Node associated with the Service Location	M	M	M	M		M	M

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			Process	**1.0 Enrollment & Qualification**								
			From	SO		SO						
			To	SP		SP	SE	MA	LSE	TDSP		
			Interaction	1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16		
				Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP		
Element			**Short Description**									
2	**50**	**Competitive Choice Area**	Flag set if the Service Location is in an area with Competitive Choice	O	O	O	O			O		
2	**51**	**Asset Multiplier**	Number of identical assets within the Service Location									
2	**60**	**NERC Control Area**	The NERC control area of the resource									
2	**71**	**Connection Type**	Additional type of connection associated with the Service Location/Resource									
2	**72**	**Connection Address**	Address associated with the Connection Type									
2	**991**	**Location Comments**	Comments associated with the Service Location	O	O	O						
3		**Contact**										
3	**10**	**Contact Type**	Interest code associated with a Contact									
3	**11**	**Contact Priority**	Order in which this Contact should be selected									

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
3	12	DUNS Number	DUNS business number							
3	13	Third Party	Flag set if the Contact is a third-party entity							
3	20	Title	Title of the Contact							
3	21	First Name	First Name of the Contact							
3	22	Last Name	Last Name of the Contact							
3	23	Contact Middle Name	Middle Name of the Contact							
3	30	Contact Method	Method of communication with the Contact							
3	31	Contact Address Data	Method-dependent Address of the Contact							
3	32	Contact Method Priority	Order in which a Communication Method should be selected for a Contact							
3	991	Contact Comments	Comments associated with the Contact	O	O					
4		Grid Connection								
4	10	Loss Factor Type	Type of Loss Factor			O			O	O
4	11	Loss Factor Value	Loss Factor			O			O	O
4	12	Connect Voltage	Voltage level							

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
			Interaction	1.0.10 Rejection Details	1.0.11 Qualification Rejection	1.0.12 Qualification Status to SP	1.0.13 Qualification Status to SE	1.0.14 Qualification Status to MA	1.0.15 Qualification Status to LSE	1.0.16 Qualification Status to TDSP
Element			**Short Description**							
4	**991**	**Grid Connection Comments**	Comments associated with the Attributes of the Resource	O	O	O				
5		**Business Entity Relationships**								
5	**11**	**Service Provider ID**	Identifier assigned to the Service Provider	M	M	M	M		M	M
5	**12**	**Service Provider Name**	Name of the Service Provider	O	O	O	O		O	O
5	**20**	**Transmission/Distribution Service Provider ID**	Identifier assigned to theTransmission/Distribution Service Provider	M	M	M	M		M	M
5	**21**	**Transmission/Distribution Service Provider Name**	Name of the Transmission/Distribution Service Provider	O	O	O	O		O	O
5	**22**	**Transmission/Distribution Service Provider Account Number**	Transmission/Distribution Service Provider's account number for the Resource	O	O	O	O		O	O
5	**30**	**Load-Serving Entity ID**	Identifier assigned to the Load-Serving Entity	O	O	M			M	M
5	**31**	**Load-Serving Entity Name**	Name of the Load-Serving Entity	O	O	O			O	O
5	**40**	**Retail Rate ID**	Identifier assigned to the Retail Rate			O			O	O

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
5	41	Retail Rate Code	Code representing the Retail Rate for the Service Location			O			O	O
5	42	Retail Rate Name	Name of the Retail Rate for the Service Location			O			O	O
5	43	Retail Rate Description	Description of the Retail Rate			O			O	O
5	44	Retail Rate	Retail Rate			O			O	O
5	50	Meter Installation Provider ID	Identifier assigned to the Meter Installation Provider			O			O	O
5	51	Meter Installation Provider Name	Name of the Meter Installation Provider			O			O	O
5	60	Meter Authority ID	Identifier assigned to the Metering Authority	M	M	M				
5	61	Meter Authority Name	Name of the Metering Authority	O	O	O				
5	70	Scheduling Entity ID	Identifier assigned to the Scheduling Entity	M	M	M				
5	71	Scheduling Entity Name	Name of the Scheduling Entity	O	O	O				
5	80	Designated Dispatch Entity ID	Idenitifier assigned to the Designated Dispatch Entity	M	M	M				
5	81	Designated Dispatch Entity Name	Name of the Designated Dispatch Entity	O	O	O				

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
5	991	External Entity Comments	Comments associated with the External Entity	O	O	O				
6		Device and Qualification								
6	10	Meter Configuration	Configuration of the Meter at the Service Location							
6	11	Parent Meter id	ID of a Master or Parent Meter							
6	20	Meter ID	Identifier assigned to the Meter	M	M	M	M			
6	21	Meter Type	Type of Meter installed at the Service Location							
6	22	Meter Manufacturer	Manufacturer of the Meter							
6	221	Meter Installation Date	Date of Installation of the Meter							
6	222	PT Ratio	Ratio of the Potential Transformer							
6	223	Meter Installer License	Professional License Number of the Installer of the Meter							
6	224	Meter Correction Factors	Device-specific Factors used to adjust for atmospheric changes at the point of installation of the Meter							
6	225	Meter Test Criteria	Test Criteria required to qualify the installation of the Meter							

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
6	226	Meter Test Frequency	Frequency of Tests of the Meter							
6	227	Device QA Plan	Quality Assurance plan for maintenance and testing of the Meter							
6	228	Date of Last Meter Test	Date of Last Test of the Meter							
6	229	Meter Qualification Date	Date of Qualification of the Meter by the Metering Authority or System Operator			O			O	O
6	2291	Meter Test Results	Results of Tests of the Meter							
6	2292	VEE Compliance	Compliance standard for Validation, Editing, and Estimation							
6	2293	Measurement Interval	Interval of time between Measurement readings							
6	2294	ANSI Compliance	ANSI standard with which the Meter complies							
6	2295	Meter Owner	Owner of the Meter	O	O	O		O		O
6	2296	Meter Asset Comments	Comments associated with the Meter Asset	O						
6	23	Meter Model	Model of the Meter							

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			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
6	24	Meter Rating	Load Rating of the Meter							
6	25	Meter Multiplier (kH)	Multiplier used to convert pulses into power units							
6	26	Meter Accuracy Class	Accuracy Class of the Meter							
6	27	Meter Loss Compensation	Line Losses included in the Meter							
6	28	Maximum Error	Error of the Meter, including end-to-end Maximum Error							
6	29	Meter Phase	Specific Phase information							
6	291	CT Ratio	Ratio of the Current Transformer							
6	30	Distributed Generator Type	Type of Distributed Generator							
6	31	Nameplate Rating	Manufacturer's output rating of the Distributed Generator							
6	32	Distributed Generator Fuel Type	Type of Fuel consumed by the Distributed Generator							
6	33	Distributed Generator Permit Type	Type of environmental authorization required to operate the Distributed Generator							
6	34	Distributed Generator Manufacturer	Manufacturer of the Distributed Generator							

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			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
6	35	**Manufactured Date of the Distributed Generator**	Date of Manufacture of the Distributed Generator							
6	36	**Installation Date of Distributed Generator**	Date of Installation of the Distributed Generator							
6	37	**Generator In-Service Date**	Date the Distributed Generator became operational							
6	38	**Normal Load Rating**	Average load picked up by the Distributed Generator during the applicable performance hours							
6	39	**Distributed Generator Name**	Name of the Distributed Generator							
6	41	**Interconnection Agreement Type**	Type of Interconnection Agreement between the Distributed Generator or Service Location and the TDSP							
6	42	**Interconnection Limits**	Limits associated with the Interconnection of the Distributed Generator or Service Location							

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
			Interaction	1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
				Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
6	43	Capable of Synchronizing to Grid	Flag set if the Service Location is capable of Synchronizing to the Grid							
6	44	Normal Breaker Status	Status of the Breaker for the Service Location under Normal operating conditions							
6	45	Breaker Status During Event	Status of the Breaker for the Service Location during an Emergency Event							
6	46	Wholesale Delivery Point Status	Flag set if the Service Location is metered at the Wholesale level							
6	47	Private Use Network	Flag set if the Resource is an Electric Network connected to the transmission grid							
6	51	UFR Settings	Setting of the Under-Frequency Relay							
6	52	Load Resource Control Device	Type of Control Device at a Service Location or deployed by a Response Method							
6	991	Distributed Generator Comments	Comments associated with the Distributed Generator	O	O	O			O	O

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
7		Market/Program Enrollment								
7	10	Program ID	Program Identifier	M	M	M	M	M	M	M
7	11	Program Name	Name of the Program	O	O	O	M	O	O	O
7	12	Market	Type of wholesale market	M	M	O			O	O
7	13	Market Product	Market Product	M	M	M	M		O	O
7	21	Effective Enrollment Date	Effective Start Date for the Enrollment			M	M		M	M
7	22	Enrollment Status	Status of the Enrollment for the Service Location or Resource	M	M	M			M	M
7	23	Resource Type	Type of Resource	O	O	O	O			O
7	24	Resource Qualification Test Date	Date the Resource demonstrated its ability to deliver a product or service	O	O	O	O			O
7	25	Enrollment End Date	Date of Termination of Enrollment	O	O	O	O		O	O
7	26	Requalification Test Date	Date the Resource will retest its ability to deliver a product or service	O	O	O	O			O

			Process	**1.0 Enrollment & Qualification**								
			From	SO		SO						
			To	SP		SP	SE	MA	LSE	TDSP		
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16		
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP		
Element			**Short Description**									
7	**30**	**Lead Time**	Time between the advanced notification and deployment			O			O	O		
7	**31**	**Day Ahead Flag**	Flag set if the Resource will be participating in the Day-Ahead market	O	O	O			O	O		
7	**32**	**Real Time Flag**	Flag set if the Resource will be participating in the Real-Time market	O	O	O			O	O		
7	**33**	**Self-Schedule Flag**	Flag set if the Resource is Self-Deploying									
7	**40**	**Response Method Type**	Type of Response Method	O	O	O	O		O	O		
7	**41**	**Response Method ID**	Identifier assigned to the Response Method	O	O	M			M	M		
7	**42**	**Response Method Name**	Name of the Response Method	O	O	O			O	O		
7	**43**	**Response Method Value**	Value of the Response Method	O	O	M	M		M	M		
7	**44**	**Verified Capability**	Audited Capability	O	O	M	M					
7	**45**	**Verified Capability Factor**	Ratio of the Verified Capability to the qualified capability			M						

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
	Element		Short Description							
7	50	Performance Evaluation Method Type Code	Code representing the Type of Measurement	M	M	M	M			
7	51	Performance Evaluation Method	Method used to Evaluate the Performance of a Resource	O	O	M				
7	991	Market Enrollment Comments	Comments associated with the Enrollment	O	O	O	O	O	O	O
8		Offer Parameters								
8	10	Offer Limit Value	Offer Limit Value	M	O	M	M		O	O
8	11	Offer Limit Type	Type of Offer Limit	M	O	M	M		O	O
8	12	Offer Limit Interval	Offer Limit Interval	M	O	M	M		O	O
8	20	Physical Min Gen	Minimum Operating Level of a Resource	O	O	O	O		O	O
8	21	Min Gen MW	Minimum MW available for dispatch	O	O	O	O		O	O
8	22	MinGenCost	The cost per hour for each Min Gen MW value.	O	O	O	O			
8	23	Ramp Rate Type	Type of Ramp Rate	M	O	O	O			
8	24	Ramp Rate Segment	Energy of Segment of the Ramp Rate	M	O	O	O			

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
8	25	Ramp Rate Direction	Direction of the selected Ramp Rate Type and Ramp Rate Segment	M	O	O	O			
8	26	Ramp Rate Value	Ramp Rate associated with the selected Ramp Rate Type for the selected Ramp Rate Segment and Ramp Rate Direction	M	O	O	O			
8	30	Offer Dispatch Type	Type of Offer		O					
8	31	Offer Segment MW	Energy of Segment of the Offer							
8	32	Offer Segment Price	Price of Segment of the Offer							
8	33	Offer Segment Hour	Hour of Segment of the Offer							
8	34	Startup Cost	Cost of starting a response activity							
8	35	Strike Price	Threshold Price							
8	36	Offer Expiration Date	Date of Expiration of the Offer							
8	37	Startup Cost Type	Type of startup cost							
8	38	Offer Commit Status	Commitment status of offer							

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
8	39	Offer Dispatch Status	Dispatch Status of Offer							
8	331	Offer Price Curve Slope	Flag to smoothe offer segments from step function to slope							
8	332	StrikePriceType	Type of strike price							
8	40	Market Clearing Day	Market Clearing Day of the Offer				O			
8	41	Schedule Name	Name or tag of the Offer				O			
8	42	Schedule Description	Description of the Offer				O			
8	43	Schedule Status	Status of the Offer				O			
8	50	Portfolio Name	Name of an aggregation of Resources for market participation				O			
8	71	Operational Constraint Type	Type of operational, schedule or offer constraint							
8	72	Operational Constraint Interval	The timeframe over which the constraint type applies.							
8	73	Operational Constraint Value	Value of the Constraint Type and Interval							

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			Process	**1.0 Enrollment & Qualification**								
			From	SO		SO						
			To	SP		SP	SE	MA	LSE	TDSP		
			Interaction	1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16		
				Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP		
Element			**Short Description**									
9		**Energy Market**										
9	**0**	**Instruction ID**										
9	**10**	**Energy Schedule - Start Time**	Start Time of the Energy Schedule									
9	**11**	**Energy Schedule - End Time**	End Time of the Energy Schedule									
9	**12**	**Energy Schedule - Interval Start Time**	Start Time of the Energy Interval within the Energy Schedule									
9	**13**	**Energy Schedule - Cleared MW Interval Value**	The Energy Value of cleared MW for the Time Interval within the Energy Schedule									
9	**14**	**Energy Schedule - Cleared Price**	Awarded Price									
9	**15**	**Schedule ID**										
9	**20**	**Base Point**	Per-interval dispatch instruction									
9	**21**	**Breaker Status**	Status of the Breaker for the Resource									
9	**22**	**Output MW**	Real Power Output of the Generation Device									

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
		Element	Short Description							
9	23	Output MVAR	Reactive Power Output of the Generation Device							
9	24	DR Bus Load MW	Instantaneous Bus Load of a Demand Resource providing Ancillary Services							
9	27	Set Point	Final dispatch target level							
10		Ancillary Service Market								
10	0	Ancillary Service Instruction ID								
10	10	Ancillary Service Product Type	Type of Ancillary Service product(s) the Resource is enrolling to provide	O	O	O	M		O	O
10	11	Have Engineering Diagram	Flag set if One-Line Diagrams have been submitted		O					
10	12	Ancillary Service Award - Start Time	Start Time of the ancillary service Award							
10	13	Ancillary Service Award - End Time	End Time of the ancillary service Award							

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			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			**Short Description**							
10	**14**	**Ancillary Service Award - Interval Start Time**	Start Time of the ancillary service Interval within the ancillary service Award and the ancillary service Value of the Time Interval							
10	**15**	**Ancillary Service Award - Interval Value**	The awarded Value for the Time Interval within the ancillary service Award							
10	**16**	**Ancillary Service Award - Cleared Price**	Awarded Price							
10	**17**	**Ancillary Service Schedule ID**								
10	**20**	**Ancillary Service Product Qualification Type**	Type of Qualification	O	O	M	M			
10	**21**	**Synchronization Test Date**	Target Date of Test of Synchronization to the grid							
10	**22**	**Ancillary Service Product Type Qualification Date**	Date of Qualification of the Resource			M	M			

			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			**Short Description**							
10	**23**	**Ancillary Service Product Type Qualified**	Type of Ancillary Service Product(s) for which the Resource has Qualified			M	M			
10	**24**	**Requalification Requirement**	Flag set if Requalification is Required	O	O					
10	**31**	**Reserve Pickup Flag**	Flag set if this is a Reserve Pickup schedule							
10	**32**	**Regulation Base Point**	Per-interval Regulation dispatch instruction							
10	**33**	**Base Load MW**	Level of Load at time of dispatch							
11		**Capacity Market**								
11	**10**	**Capacity Type**	Type of Capacity	O	O	M				
11	**11**	**Capacity Type description**	Description of the Type of Capacity	O	O	O				
11	**20**	**Peak Value**	Measurement of Peak			O			O	O
11	**21**	**Peak Type**	Type of measurement of Peak			O			O	O

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			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			Short Description							
11	22	Peak Date/Time	Date and Time of measurement of Peak			O			O	O
11	23	Nominal Capacity	Nominated load			O				
11	24	Qualified Capacity	Nominal ICAP derated for performance			M				
11	30	Capacity Obligation Period Type	Type of Capacity Obligation Time Period within which the Resource is obligated	O	O	M			M	M
11	31	Capacity Obligation Period	Period of time for which the Capacity Resource is obligated	O	O	M			M	M
11	40	Minimum Payment Nomination	Strike price for the economic dispatch of the energy component of the capacity program	O	O	O				
11	41	Capacity Supply Obligation	Capacity Obligation							
11	50	Capacity Reference ID	Identifier assigned to the External System award			O				

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			Process	1.0 Enrollment & Qualification						
			From	SO		SO				
			To	SP		SP	SE	MA	LSE	TDSP
				1.0.10	1.0.11	1.0.12	1.0.13	1.0.14	1.0.15	1.0.16
			Interaction	Rejection Details	Qualification Rejection	Qualification Status to SP	Qualification Status to SE	Qualification Status to MA	Qualification Status to LSE	Qualification Status to TDSP
Element			**Short Description**							
11	**991**	**Capacity Comments**	Comments associated with the Capacity market	O	O	O				

018-1.4.2 Scheduling and Award Notification – Economic

Overview: The Scheduling and Award Notification process describes the process from offer submission to award notification. This process also includes the supplemental commitment and reassessment of reliability to determine whether demand resources that are enrolled in reliability-based (emergency) demand response programs should be advised of a possible reliability deployment.

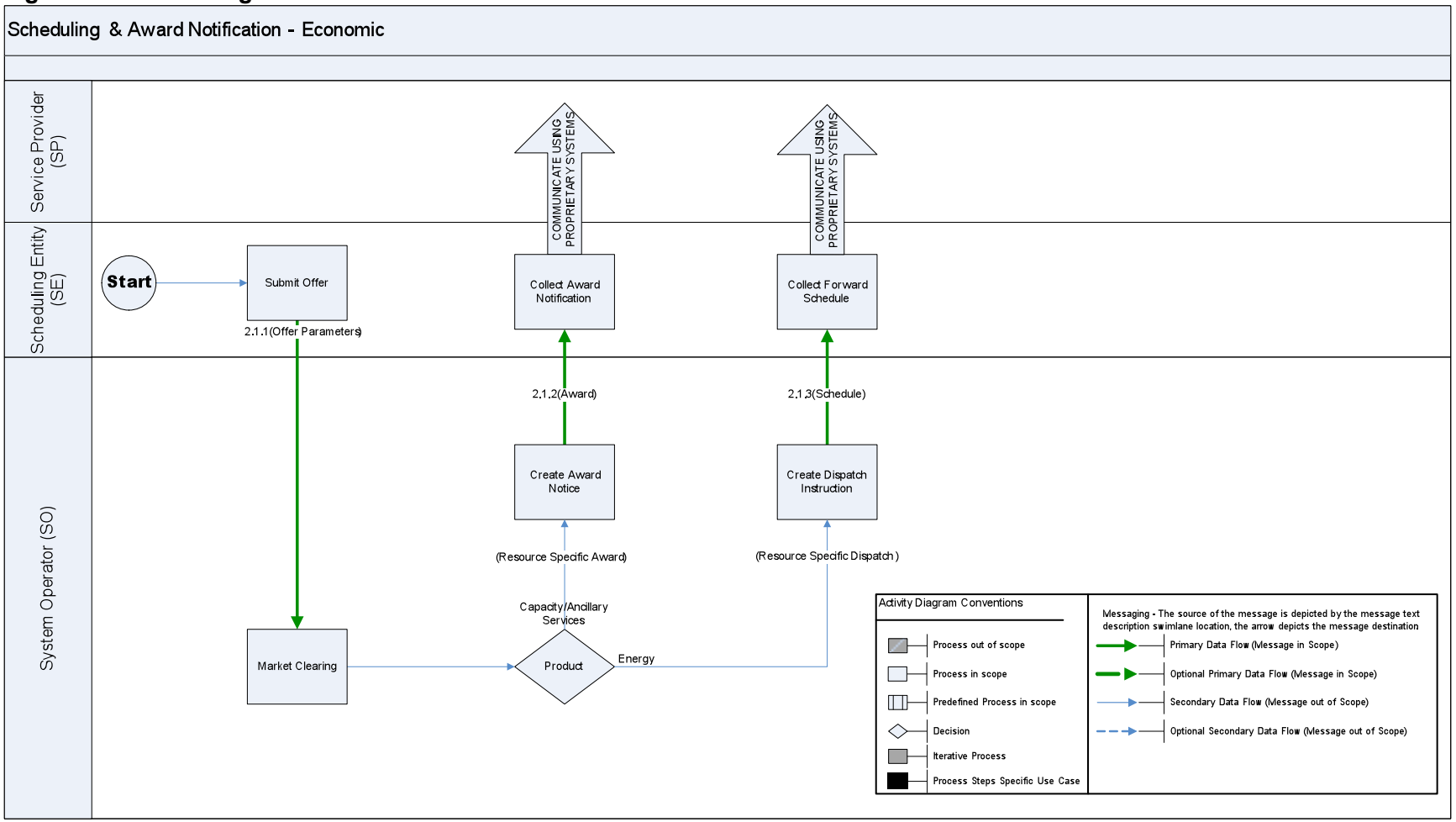
Table 6. Use Cases for Figure 3

Use Case	Product	Deployment	Performance Evaluation
C-R-1	Capacity	Resource	Baseline
C-R-2	Capacity	Resource	MB/MA
C-R-3	Capacity	Resource	MBL
C-R-4	Capacity	Resource	MGO
E-R-1	Energy (Economic)	Resource	Baseline
E-R-2	Energy (Economic)	Resource	MB/MA
E-R-3	Energy (Economic)	Resource	MBL
E-R-4	Energy (Economic)	Resource	MGO
G-R-1	Regulation	Resource	Baseline
G-R-2	Regulation	Resource	MB/MA
G-R-3	Regulation	Resource	MBL
G-R-4	Regulation	Resource	MGO
V-R-1	Reserve	Resource	Baseline
V-R-2	Reserve	Resource	MB/MA
V-R-3	Reserve	Resource	MBL
V-R-4	Reserve	Resource	MGO

- The process begins when the SE submits a supply offer to the SO.
- The SO evaluates the offer through its market clearing process.
- The resulting resource-specific dispatch information is transformed into dispatch instructions by the SO.
- The SO makes the schedule available.
- The SE collects the forward schedule.

Activity Diagram and Data Flow:

Figure 3 - Scheduling and Award Notification - Economic



Note: Data elements for Scheduling and Award Notification-Economic are listed with Scheduling and Award Notification-Reliability in Table 8.

018-1.4.3 Scheduling and Award Notification – Reliability

Overview: The Scheduling and Award Notification process describes the process from offer submission to award notification. This process also includes the supplemental commitment and reassessment of reliability to determine whether demand resources that are enrolled in reliability-based (emergency) demand response programs should be advised of a possible reliability deployment.

Table 7. Use Cases for Figure 4

Use Case	Product	Deployment	Performance Evaluation
R-B-1	Energy (Reliability)	Bulk	Baseline
R-B-3	Energy (Reliability)	Bulk	MBL
R-B-2	Energy (Reliability)	Bulk	MB/MA
R-B-4	Energy (Reliability)	Bulk	MGO
C-B-1	Capacity	Bulk	Baseline
C-B-3	Capacity	Bulk	MBL
C-B-2	Capacity	Bulk	MB/MA
C-B-4	Capacity	Bulk	MGO
V-B-1	Reserve	Bulk	Baseline
V-B-3	Reserve	Bulk	MBL
V-B-2	Reserve	Bulk	MB/MA
V-B-4	Reserve	Bulk	MGO
V-R-1	Reserve	Resource	Baseline
V-R-3	Reserve	Resource	MBL
V-R-2	Reserve	Resource	MB/MA
V-R-4	Reserve	Resource	MGO

- The process begins when the SE submits availability to the SO.
- The SO performs the Load Forecast and Supplemental Commitment process after the market has been settled. Reliability is reassessed by the SO to determine whether the system is secure (sufficient supply to meet forecasted load conditions).
  - If SO determines that the system is secure, no demand response advance notification is required and reliability is assessed by the SO at the next interval.
  - If SO anticipates that a reliability issue is expected, the SO decides whether demand response is needed for reliability.
    - If demand response will not be needed, the process ends.
    - If the SO determines that demand response will be provided with an advance notification, the reliability event parameters are prepared by the SO to create a reliability event notification.

- The advance notification message is sent to the SE.
- The SE identifies the demand resources to notify and relays the message to SPs through the proprietary interaction system of the SE.

Activity Diagram and Data Flow:

Figure 4 - Scheduling and Award Notification - Reliability

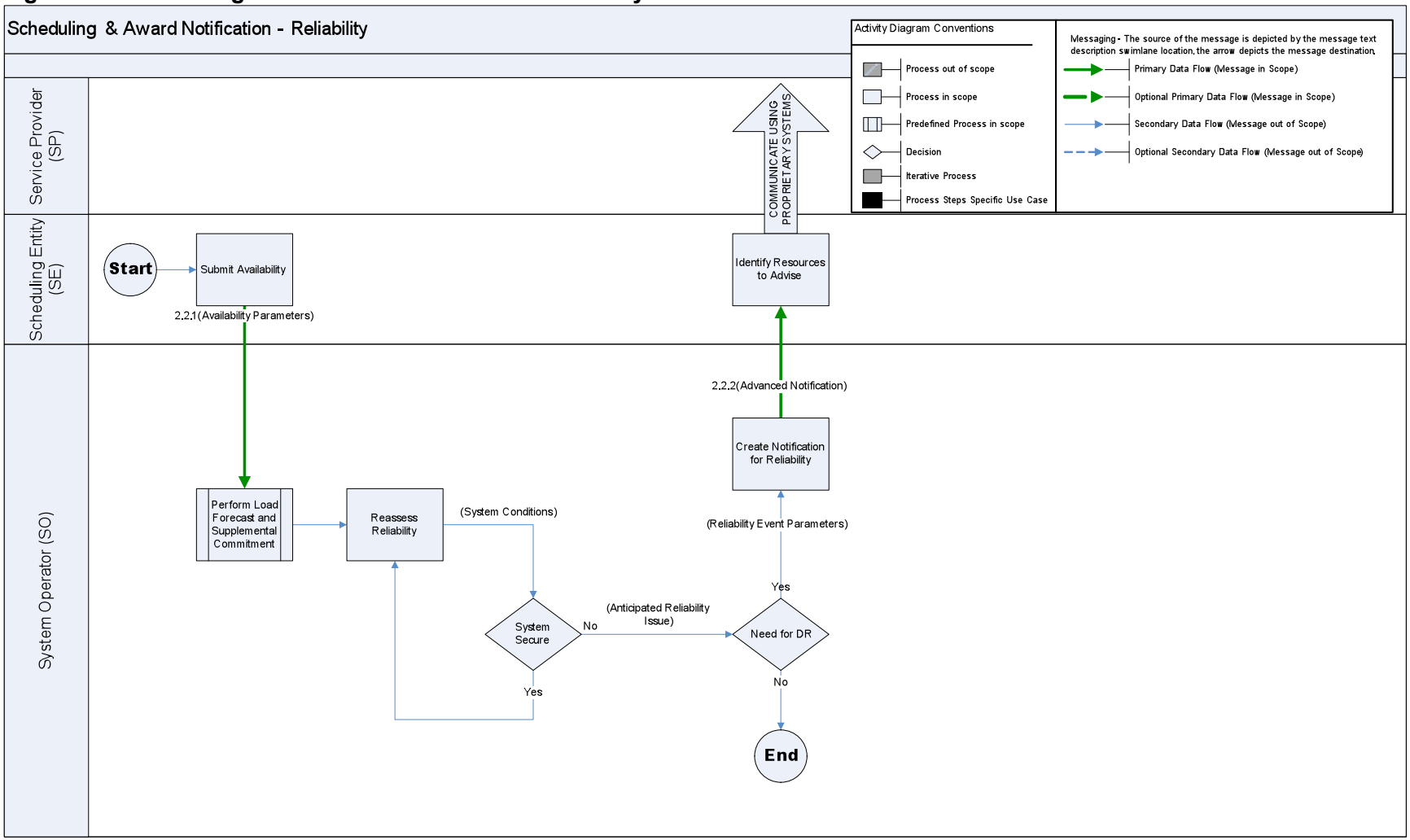


Table 8. Data Requirements by Interaction Number: Scheduling and Award Notification

			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1 Offer Parameters	2.1.2 Award	2.1.3 Schedule	2.2.1 Availability Parameters	2.2.2 Advanced Notification
Element			Short Description					
0		**Common**						
0	**10**	**Submittal Date**	Timestamp for the sender's use	O	O	O	O	O
0	**11**	**Submitted By**	User ID of submitter	O	O	O	O	O
0	**12**	**Submitted Error**	ID of submission error detected	O	O	O	O	O
0	**20**	**NERC CIP Security - Availability**	CIP Security Classification for Availability	M	M	M	M	M
0	**21**	**NERC CIP Security - Confidentiality**	CIP Security Classification for Confidentiality	M	M	M	M	M
0	**22**	**NERC CIP Security - Integrity**	CIP Security Classification for Integrity	M	M	M	M	M
1		**General Asset/Resource**						
1	**10**	**Service Location ID**	Identifier assigned to the Service Location	O	O	O	O	O

			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1 Offer Parameters	2.1.2 Award	2.1.3 Schedule	2.2.1 Availability Parameters	2.2.2 Advanced Notification
Element			Short Description					
1	11	Service Location Name	Name of the Service Location	O	O	O	M	O
1	12	Asset ID	The unique identifier of the asset	O	O	O	O	O
1	13	Asset Name	The name of the asset	O	O	O	O	O
1	20	Resource ID	Identifier assigned to the Resource	M	M	M	M	O
1	21	Resource Name	Name of the Resource	O	O	O	M	O
1	40	GenEMSID	Alias or point Identifier assigned to the Resource	M	M	M		
1	41	GenBillingID	Billing Identifier assigned to the Resource	M	M	M		
2		Location						
2	30	Zone ID	Identifier assigned to the Zone in which the Service Location is located	M	M	M	M	M

			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1 Offer Parameters	2.1.2 Award	2.1.3 Schedule	2.2.1 Availability Parameters	2.2.2 Advanced Notification
Element			Short Description					
2	31	Zone	Name of the Zone in which the Service Location is located	O	O	O	O	O
2	32	Zone Type	Type of Zone	O	O	O	O	O
2	40	Electrical Node ID	Identifier assigned to the Electrical Node at which the Service Location is connected	M	M	M	O	
2	41	Electrical Node Name	Name of the Electrical Node at which the Service Location is connected	O	O	O	O	
2	42	Electrical Node Type	Type of Electrical Node at which the Service Location is attached	O	O	O	O	
2	43	PNode	Name of the Price Node associated with the Service Location	O	O	O	O	O

			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1	2.1.2	2.1.3	2.2.1	2.2.2
				Offer Parameters	Award	Schedule	Availability Parameters	Advanced Notification
Element			Short Description					
2	44	PNode ID	Identifier assigned to the Price Node associated with the Service Location	M	M	M	M	M
5		Business Entity Relationships						
5	11	Service Provider ID	Identifier assigned to the Service Provider			O	M	M
5	12	Service Provider Name	Name of the Service Provider			O	M	M
5	20	Transmission/Distribution Service Provider ID	Identifier assigned to theTransmission/Distribution Service Provider			O	O	
5	21	Transmission/Distribution Service Provider Name	Name of the Transmission/Distribution Service Provider			O	O	
5	22	Transmission/Distribution Service Provider Account Number	Transmission/Distribution Service Provider's account number for the Resource			O	O	

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			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1 Offer Parameters	2.1.2 Award	2.1.3 Schedule	2.2.1 Availability Parameters	2.2.2 Advanced Notification
Element			Short Description					
5	30	Load-Serving Entity ID	Identifier assigned to the Load-Serving Entity			O	O	
5	31	Load-Serving Entity Name	Name of the Load-Serving Entity			O	O	
5	70	Scheduling Entity ID	Identifier assigned to the Scheduling Entity	M	M	M	M	M
5	71	Scheduling Entity Name	Name of the Scheduling Entity	O	O	O	O	O
5	80	Designated Dispatch Entity ID	Idenitifier assigned to the Designated Dispatch Entity	M	M	M	M	M
5	81	Designated Dispatch Entity Name	Name of the Designated Dispatch Entity	O	O	O	O	O
6		Device and Qualification						
6	20	Meter ID	Identifier assigned to the Meter	O	O	O	O	
6	44	Normal Breaker Status	Status of the Breaker for the Service Location under Normal operating conditions				M	

			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1	2.1.2	2.1.3	2.2.1	2.2.2
				Offer Parameters	Award	Schedule	Availability Parameters	Advanced Notification
Element			Short Description					
6	45	Breaker Status During Event	Status of the Breaker for the Service Location during an Emergency Event				M	
6	46	Wholesale Delivery Point Status	Flag set if the Service Location is metered at the Wholesale level				M	
6	47	Private Use Network	Flag set if the Resource is an Electric Network connected to the transmission grid				M	
6	51	UFR Settings	Setting of the Under-Frequency Relay				M	
6	52	Load Resource Control Device	Type of Control Device at a Service Location or deployed by a Response Method				M	
7		Market/Program Enrollment						
7	10	Program ID	Program Identifier	O	O	O	O	O
7	11	Program Name	Name of the Program	O	O	O	O	O

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			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1 Offer Parameters	2.1.2 Award	2.1.3 Schedule	2.2.1 Availability Parameters	2.2.2 Advanced Notification
Element			Short Description					
7	12	Market	Type of wholesale market	O	O	O	O	O
7	13	Market Product	Market Product	O	O	O	O	O
7	30	Lead Time	Time between the advanced notification and deployment	O	O		O	O
7	31	Day Ahead Flag	Flag set if the Resource will be participating in the Day-Ahead market	M	M	M	M	M
7	32	Real Time Flag	Flag set if the Resource will be participating in the Real-Time market	M	M	M	M	M
7	33	Self-Schedule Flag	Flag set if the Resource is Self-Deploying	O	O	O	O	
7	40	Response Method Type	Type of Response Method		O	O		
7	41	Response Method ID	Identifier assigned to the Response Method		O	O		
7	42	Response Method Name	Name of the Response Method		O	O		

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			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1 Offer Parameters	2.1.2 Award	2.1.3 Schedule	2.2.1 Availability Parameters	2.2.2 Advanced Notification
Element			Short Description					
7	43	**Response Method Value**	Value of the Response Method		O	O		
7	44	**Verified Capability**	Audited Capability				O	
7	45	**Verified Capability Factor**	Ratio of the Verified Capability to the qualified capability				O	
8		**Offer Parameters**						
8	10	**Offer Limit Value**	Offer Limit Value	M			M	O
8	11	**Offer Limit Type**	Type of Offer Limit	M			M	O
8	12	**Offer Limit Interval**	Offer Limit Interval	O			M	O
8	20	**Physical Min Gen**	Minimum Operating Level of a Resource	O			M	
8	21	**Min Gen MW**	Minimum MW available for dispatch	M			M	O

			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1 Offer Parameters	2.1.2 Award	2.1.3 Schedule	2.2.1 Availability Parameters	2.2.2 Advanced Notification
Element			Short Description					
8	22	MinGenCost	The cost per hour for each Min Gen MW value.	M			M	O
8	23	Ramp Rate Type	Type of Ramp Rate	O			M	
8	24	Ramp Rate Segment	Energy of Segment of the Ramp Rate	O			M	
8	25	Ramp Rate Direction	Direction of the selected Ramp Rate Type and Ramp Rate Segment	O				
8	26	Ramp Rate Value	Ramp Rate associated with the selected Ramp Rate Type for the selected Ramp Rate Segment and Ramp Rate Direction	O				
8	30	Offer Dispatch Type	Type of Offer	M	M	M		
8	31	Offer Segment MW	Energy of Segment of the Offer	M	M	M	O	O
8	32	Offer Segment Price	Price of Segment of the Offer	M	M	M	O	O

			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1	2.1.2	2.1.3	2.2.1	2.2.2
				Offer Parameters	Award	Schedule	Availability Parameters	Advanced Notification
Element			Short Description					
8	33	Offer Segment Hour	Hour of Segment of the Offer	M	M	M	O	O
8	34	Startup Cost	Cost of starting a response activity	M	M	M	O	O
8	35	Strike Price	Threshold Price	O	O	O		
8	36	Offer Expiration Date	Date of Expiration of the Offer	M				
8	37	Startup Cost Type	Type of startup cost	M			M	
8	38	Offer Commit Status	Commitment status of offer	M			M	
8	39	Offer Dispatch Status	Dispatch Status of Offer	M			M	
8	331	Offer Price Curve Slope	Flag to smoothe offer segments from step function to slope	M			M	
8	332	StrikePriceType	Type of strike price	O			O	
8	40	Market Clearing Day	Market Clearing Day of the Offer	M	M	M	M	M

			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1 Offer Parameters	2.1.2 Award	2.1.3 Schedule	2.2.1 Availability Parameters	2.2.2 Advanced Notification
Element			Short Description					
8	41	Schedule Name	Name or tag of the Offer	O	O	O	O	O
8	42	Schedule Description	Description of the Offer	O	O	O	O	O
8	43	Schedule Status	Status of the Offer	M	M	M	O	O
8	50	Portfolio Name	Name of an aggregation of Resources for market participation	O	O	O	O	O
8	71	Operational Constraint Type	Type of operational, schedule or offer constraint	M			M	
8	72	Operational Constraint Interval	The timeframe over which the constraint type applies.	M			M	
8	73	Operational Constraint Value	Value of the Constraint Type and Interval	M			M	
9		Energy Market						
9	0	Instruction ID		O	O	O		
9	10	Energy Schedule - Start Time	Start Time of the Energy Schedule	M	M	M		

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			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1 Offer Parameters	2.1.2 Award	2.1.3 Schedule	2.2.1 Availability Parameters	2.2.2 Advanced Notification
Element			**Short Description**					
9	**11**	**Energy Schedule - End Time**	End Time of the Energy Schedule	M	M	M		
9	**12**	**Energy Schedule - Interval Start Time**	Start Time of the Energy Interval within the Energy Schedule	M	M	M		
9	**13**	**Energy Schedule - Cleared MW Interval Value**	The Energy Value of cleared MW for the Time Interval within the Energy Schedule		M	M		
9	**14**	**Energy Schedule - Cleared Price**	Awarded Price		M	M		
9	**15**	**Schedule ID**		O		O		
9	**20**	**Base Point**	Per-interval dispatch instruction					
9	**21**	**Breaker Status**	Status of the Breaker for the Resource					
9	**22**	**Output MW**	Real Power Output of the Generation Device					

			Process	**2.0 Scheduling and Award Notification**					
				2.1 Economic			**2.2 Reliability**		
			From	SE	SO		SE	SO	
			To	SO	SE	SE	SO	SE	
			Interaction	2.1.1	2.1.2	2.1.3	2.2.1	2.2.2	
				Offer Parameters	Award	Schedule	Availability Parameters	Advanced Notification	
Element			**Short Description**						
9	**23**	**Output MVAR**	Reactive Power Output of the Generation Device						
9	**24**	**DR Bus Load MW**	Instantaneous Bus Load of a Demand Resource providing Ancillary Services						
9	**27**	**Set Point**	Final dispatch target level						
10		**Ancillary Service Market**							
10	**0**	**Ancillary Service Instruction ID**			O	O			
10	**10**	**Ancillary Service Product Type**	Type of Ancillary Service product(s) the Resource is enrolling to provide	M	M	M	M		
10	**12**	**Ancillary Service Award - Start Time**	Start Time of the ancillary service Award		M				
10	**13**	**Ancillary Service Award - End Time**	End Time of the ancillary service Award		M				

			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1 Offer Parameters	2.1.2 Award	2.1.3 Schedule	2.2.1 Availability Parameters	2.2.2 Advanced Notification
Element			Short Description					
10	14	Ancillary Service Award - Interval Start Time	Start Time of the ancillary service Interval within the ancillary service Award and the ancillary service Value of the Time Interval		M			
10	15	Ancillary Service Award - Interval Value	The awarded Value for the Time Interval within the ancillary service Award		M			
10	16	Ancillary Service Award - Cleared Price	Awarded Price		M			
10	17	Ancillary Service Schedule ID				O		
10	31	Reserve Pickup Flag	Flag set if this is a Reserve Pickup schedule		O	O		
10	32	Regulation Base Point	Per-interval Regulation dispatch instruction					

RECOMMENDATION TO NAESB EXECUTIVE COMMITTEE
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			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1 Offer Parameters	2.1.2 Award	2.1.3 Schedule	2.2.1 Availability Parameters	2.2.2 Advanced Notification
Element			**Short Description**					
10	**33**	**Base Load MW**	Level of Load at time of dispatch					
11		**Capacity Market**						
11	**10**	**Capacity Type**	Type of Capacity	M	M	M	O	
11	**20**	**Peak Value**	Measurement of Peak			O	O	
11	**21**	**Peak Type**	Type of measurement of Peak			O	O	
11	**22**	**Peak Date/Time**	Date and Time of measurement of Peak			O	O	
11	**23**	**Nominal Capacity**	Nominated load	O	O	O		
11	**24**	**Qualified Capacity**	Nominal ICAP derated for performance	M	M	M	O	
11	**30**	**Capacity Obligation Period Type**	Type of Capacity Obligation Time Period within which the Resource is obligated	M	M	M	O	

			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1	2.1.2	2.1.3	2.2.1	2.2.2
				Offer Parameters	Award	Schedule	Availability Parameters	Advanced Notification
Element			Short Description					
11	31	Capacity Obligation Period	Period of time for which the Capacity Resource is obligated	M	M	M	O	
11	40	Minimum Payment Nomination	Strike price for the economic dispatch of the energy component of the capacity program	M	O	O	O	
11	41	Capacity Supply Obligation	Capacity Obligation	M	M	M	O	
11	50	Capacity Reference ID	Identifier assigned to the External System award	O	O	O	O	
11	991	Capacity Comments	Comments associated with the Capacity market	O	O	O	O	
12		Event and Performance						
12	10	Event ID	Identifier assigned to the Event					O

			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1	2.1.2	2.1.3	2.2.1	2.2.2
				Offer Parameters	Award	Schedule	Availability Parameters	Advanced Notification
Element			Short Description					
12	11	**Deployment Type**	Type of Deployment					M
12	12	**Event Day**	Operating Date of Start of Event					M
12	13	**Event Description**	Description of the Event					M
12	14	**Event Start Time**	Time of Start of deployment period for Event					M
12	15	**Operator Comment**	Additional Event information provided by the Operator					O
12	16	**Deployment MW**	Absolute or relative Deployment quantity					O
12	17	**Event Status**	Status of the Event					O
12	18	**Event End Time**	Time of End of deployment period					M

			Process	2.0 Scheduling and Award Notification				
				2.1 Economic			2.2 Reliability	
			From	SE	SO		SE	SO
			To	SO	SE	SE	SO	SE
			Interaction	2.1.1	2.1.2	2.1.3	2.2.1	2.2.2
				Offer Parameters	Award	Schedule	Availability Parameters	Advanced Notification
Element			Short Description					
12	19	Event Modification Number	A modification number for the event.					O
12	111	Notification Acknowledgement	This is an acknowledgement of the receipt of a DR notification or dispatch. It should include any necessary provisions for non-repudiation.					O
12	112	Event Modification Reason Code	The reason the event is being cancelled or modified.					O
12	991	Event & Performance comments	Comments associated with Event and Performance data					O

018-1.4.4 Deployment and Real-Time Communications - Economic

Overview: The Deployment and Real-Time Communication process describes the process for real-time communications to demand resources providing market-based services on a real-time basis and dispatch for reliability-based (emergency) demand response programs. The business activity diagrams and descriptions below reflect a sequential nature to the real-time process solely for the purposes of describing the process of the real-time data flow; the real-time communication process simultaneously scans and updates in the same step.

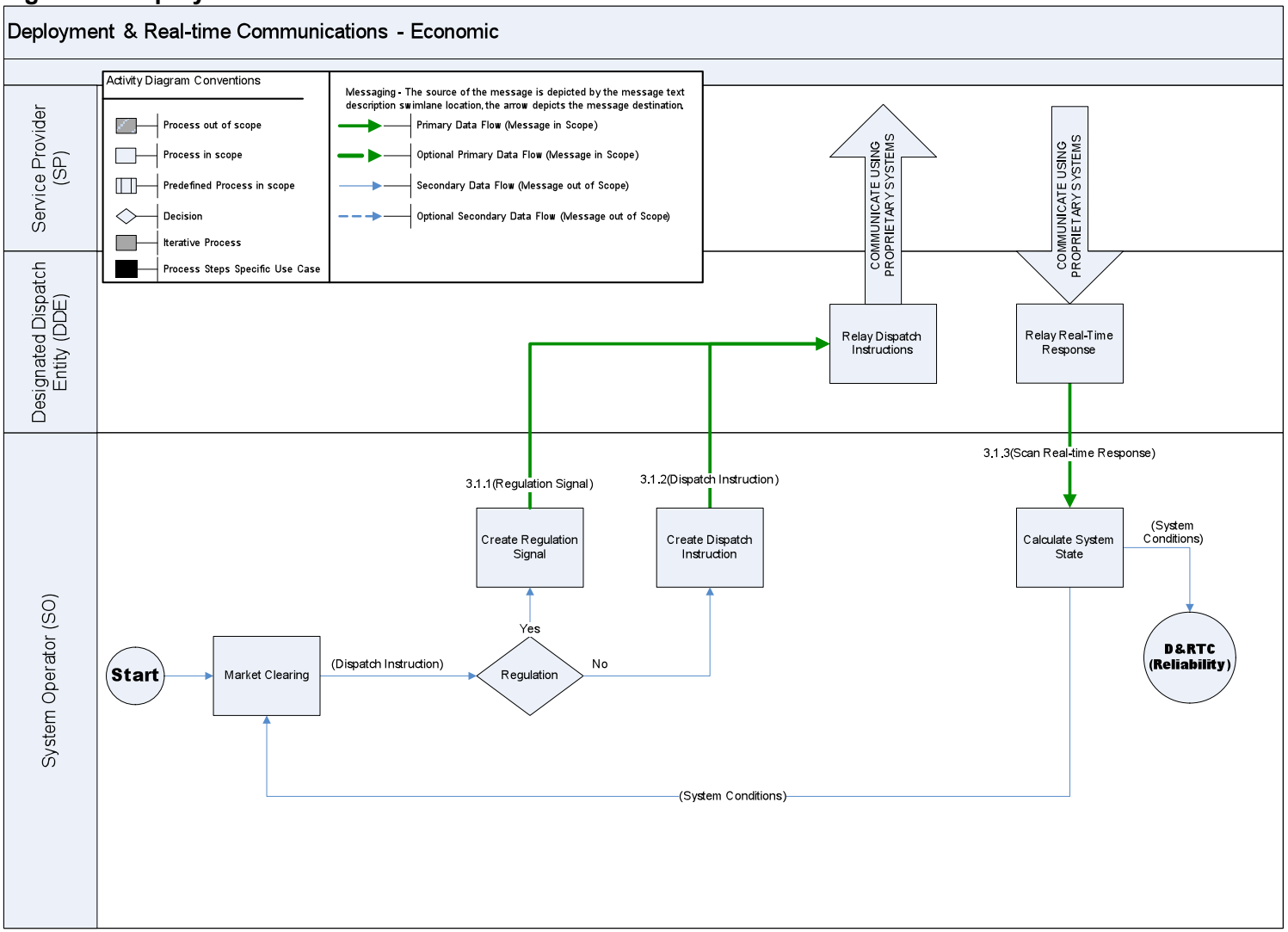
Table 9. Use Cases for Figure 5

Use Case	Product	Deployment	Performance Evaluation
E-R-1	Energy (Economic)	Resource	Baseline
R-B-1	Energy (Reliability)	Bulk	Baseline
R-B-4	Energy (Reliability)	Bulk	MGO
V-R-2	Reserve	Resource	MB/MA
G-R-2	Regulation	Resource	MB/MA

- The process begins when the SO evaluates real-time system conditions through its market clearing process.
- The resulting resource-specific real-time dispatch information is transformed into dispatch instructions by the SO.
  - If the dispatch instruction is for Regulation, the SO sends the Regulation signal to the DDE.
  - If the dispatch is not for Regulation, the SO sends the dispatch instruction to the DDE.
- The DDE communicates with the SP through the proprietary communication system of the DDE.
- The SO collects real-time response from the DDE for evaluating the next interval and uses the information to calculate the system state.
- System conditions are made available to the market clearing process for the next interval and to Deployment and Real-Time Communications – Reliability.

Activity Diagram and Data Flow:

Figure 5 - Deployment and Real-Time Communications - Economic



Note: Data elements for Deployment & Real-Time Communications-Economic are listed with Deployment & Real-Time Communications-Reliability in Table 11.

018-1.4.5 Deployment and Real-Time Communications – Reliability

Overview: The Deployment and Real-Time Communication process describes the process for real-time communications to demand resources providing market-based services on a real-time basis and dispatch for reliability-based (emergency) demand response programs. The business activity diagrams and descriptions below reflect a sequential nature to the real-time process solely for the purposes of describing the process of the real-time data flow; the real-time communication process simultaneously scans and updates in the same step.

Table 10. Use Cases for Figure 6

Use Case	Product	Deployment	Performance Evaluation
C-B-1	Capacity	Bulk	Baseline
C-B-3	Capacity	Bulk	MBL
E-B-1	Energy (Economic)	Bulk	Baseline
E-B-4	Energy (Economic)	Bulk	MGO
E-R-1	Energy (Economic)	Resource	Baseline
V-B-1	Reserve	Bulk	Baseline
V-B-2	Reserve	Bulk	MB/MA
V-B-3	Reserve	Bulk	MBL
V-B-4	Reserve	Bulk	MGO
V-R-1	Reserve	Resource	Baseline
V-R-2	Reserve	Resource	MB/MA
V-R-3	Reserve	Resource	MBL
V-R-4	Reserve	Resource	MGO
V-S-1	Reserve	Self	Baseline
V-S-2	Reserve	Self	MB/MA
V-S-3	Reserve	Self	MBL
V-S-4	Reserve	Self	MGO

- The SO performs the Load Forecast and Supplemental Commitment process after the interval has been dispatched. Reliability is reassessed by the SO to determine whether the system is secure (sufficient supply to meet forecasted load conditions).
  - If SO determines that the system is secure, no demand response deployment is required and reliability is assessed by the SO at the next interval.
  - If SO anticipates that a reliability issue is expected, the SO decides whether demand response is needed for reliability.
    - If demand response will not be needed, the process ends.

- If the SO determines that demand response will be deployed, the reliability event parameters are prepared by the SO to create a reliability event notification.
  - The deployment instruction is sent to the DDE.
  - The DDE identifies the demand resources to notify and relays the message to SPs through the proprietary communication system of the DDE.
- Real-time or near real-time response data is collected by DDE using the proprietary communication system of the DDE.
- The DDE sends the event response information to the SO.

Activity Diagram and Data Flow:

Figure 6 - Deployment and Real-Time Communications - Reliability

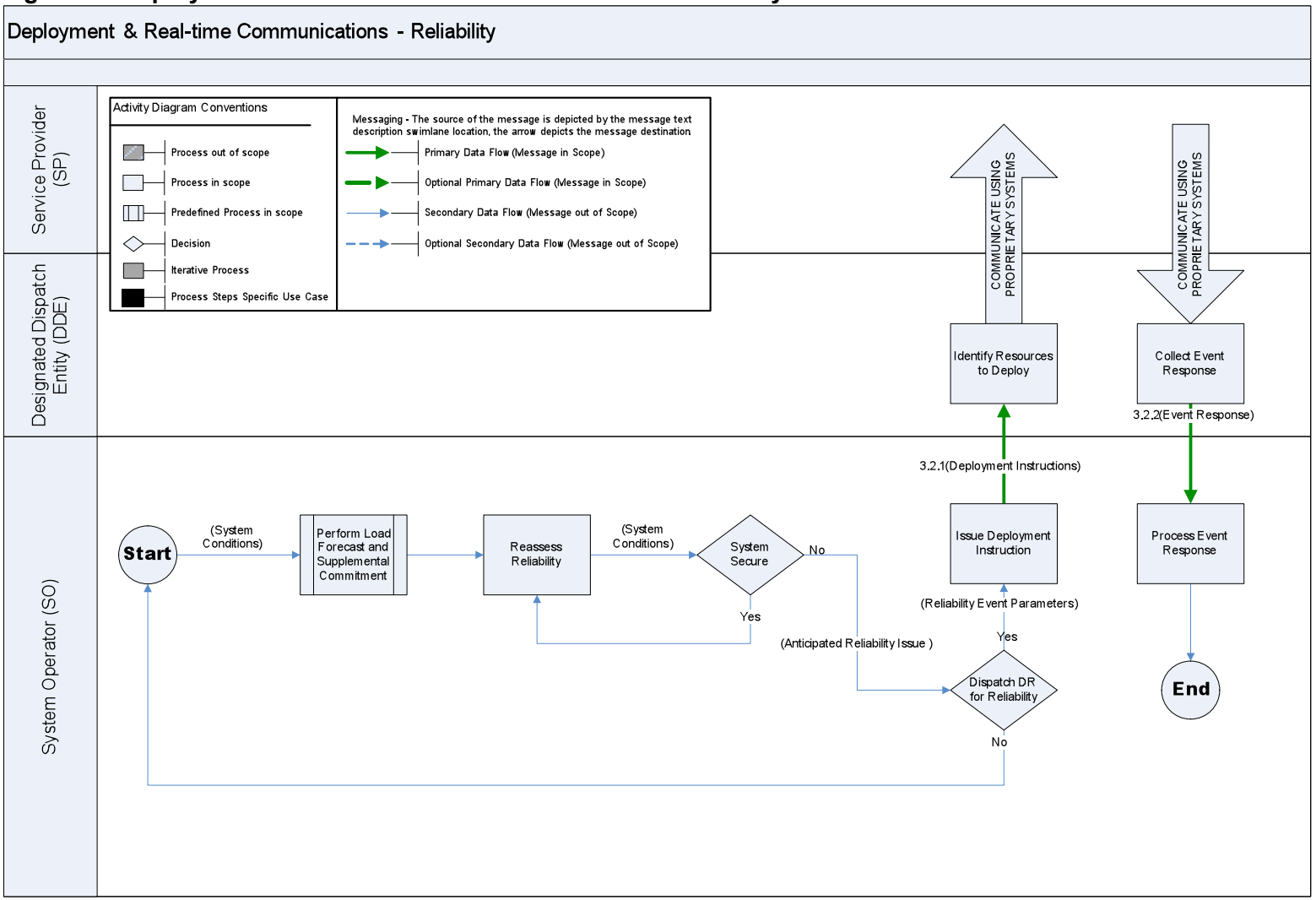


Table 11. Data Requirements by Interaction Number: Deployment & Real-Time Communications

		Process	3.0 Deployment & Real-Time Communications				
			3.1 Economic			3.2 Reliability	
		From	SO		DDE	SO	DDE
		To	DDE	DDE	SO	DDE	SO
			3.1.1	3.1.2	3.1.3	3.2.1	3.2.2
		Interaction	Regulation Signal	Dispatch Instruction	Real-Time Response	Deployment Instructions	Event Response
Element		Short Description					
0		**Common**					
0	**10**	**Submittal Date**	Timestamp for the sender's use	O			O	O
0	**11**	**Submitted By**	User ID of submitter	O			O	O
0	**12**	**Submitted Error**	ID of submission error detected	O			O	O
0	**20**	**NERC CIP Security - Availability**	CIP Security Classification for Availability	M	M	M	M	M
0	**21**	**NERC CIP Security - Confidentiality**	CIP Security Classification for Confidentiality	M	M	M	M	M
0	**22**	**NERC CIP Security - Integrity**	CIP Security Classification for Integrity	M	M	M	M	M
1		**General Asset/Resource**					
1	**10**	**Service Location ID**	Identifier assigned to the Service Location	M	O	O	M	M
1	**11**	**Service Location Name**	Name of the Service Location	O	O	O	M	M

			Process	3.0 Deployment & Real-Time Communications				
				3.1 Economic			3.2 Reliability	
			From	SO		DDE	SO	DDE
			To	DDE	DDE	SO	DDE	SO
			Interaction	3.1.1 Regulation Signal	3.1.2 Dispatch Instruction	3.1.3 Real-Time Response	3.2.1 Deployment Instructions	3.2.2 Event Response
Element			Short Description					
1	12	Asset ID	The unique identifier of the asset	O	O	O	O	O
1	13	Asset Name	The name of the asset	O	O	O	O	O
1	20	Resource ID	Identifier assigned to the Resource	M	M	M	M	M
1	21	Resource Name	Name of the Resource	O	O	O	M	M
1	30	Asset Group ID	The identifier of a group of assets			O		O
1	31	Asset Group Name	Name of the aggregated group of assets			O		O
1	40	GenEMSID	Alias or point Identifier assigned to the Resource	M	M	M		
1	41	GenBillingID	Billing Identifier assigned to the Resource	M	M	M		
2		Location						

			Process	3.0 Deployment & Real-Time Communications				
				3.1 Economic			3.2 Reliability	
			From	SO		DDE	SO	DDE
			To	DDE	DDE	SO	DDE	SO
				3.1.1	3.1.2	3.1.3	3.2.1	3.2.2
			Interaction	Regulation Signal	Dispatch Instruction	Real-Time Response	Deployment Instructions	Event Response
Element			Short Description					
2	30	Zone ID	Identifier assigned to the Zone in which the Service Location is located				M	M
2	31	Zone	Name of the Zone in which the Service Location is located				O	O
2	32	Zone Type	Type of Zone				O	O
2	40	Electrical Node ID	Identifier assigned to the Electrical Node at which the Service Location is connected	O	O	O	O	O
2	41	Electrical Node Name	Name of the Electrical Node at which the Service Location is connected	O	O	O		
2	43	PNode	Name of the Price Node associated with the Service Location		O			
2	44	PNode ID	Identifier assigned to the Price Node associated with the Service Location		M			

			Process	3.0 Deployment & Real-Time Communications				
				3.1 Economic			3.2 Reliability	
			From	SO		DDE	SO	DDE
			To	DDE	DDE	SO	DDE	SO
				3.1.1	3.1.2	3.1.3	3.2.1	3.2.2
			Interaction	Regulation Signal	Dispatch Instruction	Real-Time Response	Deployment Instructions	Event Response
Element			Short Description					
2	71	Connection Type	Additional type of connection associated with the Service Location/Resource	O	O		O	
2	72	Connection Address	Address associated with the Connection Type	O	O		O	
5		Business Entity Relationships						
5	11	Service Provider ID	Identifier assigned to the Service Provider				M	M
5	12	Service Provider Name	Name of the Service Provider				O	O
5	20	Transmission/Distribution Service Provider ID	Identifier assigned to the Transmission/Distribution Service Provider	O	O	O		
5	21	Transmission/Distribution Service Provider Name	Name of the Transmission/Distribution Service Provider	O	O	O		
5	70	Scheduling Entity ID	Identifier assigned to the Scheduling Entity	M	M	M	M	M
5	71	Scheduling Entity Name	Name of the Scheduling Entity	O	O	O	O	O

			Process	3.0 Deployment & Real-Time Communications				
				3.1 Economic			3.2 Reliability	
			From	SO		DDE	SO	DDE
			To	DDE	DDE	SO	DDE	SO
			Interaction	3.1.1 Regulation Signal	3.1.2 Dispatch Instruction	3.1.3 Real-Time Response	3.2.1 Deployment Instructions	3.2.2 Event Response
Element			Short Description					
5	80	Designated Dispatch Entity ID	Idenitifier assigned to the Designated Dispatch Entity	M	M	M	M	M
5	81	Designated Dispatch Entity Name	Name of the Designated Dispatch Entity	O	O	O	O	O
6		Device and Qualification						
6	20	Meter ID	Identifier assigned to the Meter	O	O	O		
6	44	Normal Breaker Status	Status of the Breaker for the Service Location under Normal operating conditions				M	
6	45	Breaker Status During Event	Status of the Breaker for the Service Location during an Emergency Event			M	M	M
6	46	Wholesale Delivery Point Status	Flag set if the Service Location is metered at the Wholesale level			M	M	M
6	47	Private Use Network	Flag set if the Resource is an Electric Network connected to the transmission grid			M	M	M

			Process	3.0 Deployment & Real-Time Communications				
				3.1 Economic			3.2 Reliability	
			From	SO		DDE	SO	DDE
			To	DDE	DDE	SO	DDE	SO
			Interaction	3.1.1 Regulation Signal	3.1.2 Dispatch Instruction	3.1.3 Real-Time Response	3.2.1 Deployment Instructions	3.2.2 Event Response
Element			Short Description					
6	51	**UFR Settings**	Setting of the Under-Frequency Relay			M	M	M
6	52	**Load Resource Control Device**	Type of Control Device at a Service Location or deployed by a Response Method			M	M	M
7		**Market/Program Enrollment**						
7	10	**Program ID**	Program Identifier	O	O	O	M	M
7	11	**Program Name**	Name of the Program	O	O	O	M	M
7	12	**Market**	Type of wholesale market	O	O	O	O	O
7	13	**Market Product**	Market Product	O	O	O	O	O
7	30	**Lead Time**	Time between the advanced notification and deployment	O	O	O		
7	31	**Day Ahead Flag**	Flag set if the Resource will be participating in the Day-Ahead market	O	O	O		
7	32	**Real Time Flag**	Flag set if the Resource will be participating in the Real-Time market	O	O	O		

			Process	3.0 Deployment & Real-Time Communications				
				3.1 Economic			3.2 Reliability	
			From	SO		DDE	SO	DDE
			To	DDE	DDE	SO	DDE	SO
				3.1.1	3.1.2	3.1.3	3.2.1	3.2.2
			Interaction	Regulation Signal	Dispatch Instruction	Real-Time Response	Deployment Instructions	Event Response
Element			Short Description					
7	33	Self-Schedule Flag	Flag set if the Resource is Self-Deploying		O	O		
8		Offer Parameters						
8	10	Offer Limit Value	Offer Limit Value	O	O			
8	11	Offer Limit Type	Type of Offer Limit	O	O			
8	12	Offer Limit Interval	Offer Limit Interval	O	O			
8	21	Min Gen MW	Minimum MW available for dispatch	O	O			
8	22	MinGenCost	The cost per hour for each Min Gen MW value.	O	O			
8	40	Market Clearing Day	Market Clearing Day of the Offer	M	M	M	M	M
8	41	Schedule Name	Name or tag of the Offer	O	O	O	O	O
8	42	Schedule Description	Description of the Offer	O	O	O	O	O
8	43	Schedule Status	Status of the Offer	O	O	O	O	O

			Process	3.0 Deployment & Real-Time Communications				
				3.1 Economic			3.2 Reliability	
			From	SO		DDE	SO	DDE
			To	DDE	DDE	SO	DDE	SO
				3.1.1	3.1.2	3.1.3	3.2.1	3.2.2
			Interaction	Regulation Signal	Dispatch Instruction	Real-Time Response	Deployment Instructions	Event Response
Element			Short Description					
8	50	**Portfolio Name**	Name of an aggregation of Resources for market participation	O	O	O	O	O
9		**Energy Market**						
9	0	**Instruction ID**		O	O			
9	10	**Energy Schedule - Start Time**	Start Time of the Energy Schedule	O	O			
9	11	**Energy Schedule - End Time**	End Time of the Energy Schedule	O	O			
9	12	**Energy Schedule - Interval Start Time**	Start Time of the Energy Interval within the Energy Schedule	O	O			
9	13	**Energy Schedule - Cleared MW Interval Value**	The Energy Value of cleared MW for the Time Interval within the Energy Schedule	O	O			
9	14	**Energy Schedule - Cleared Price**	Awarded Price	O				
9	15	**Schedule ID**		O	O			

			Process	3.0 Deployment & Real-Time Communications				
				3.1 Economic			3.2 Reliability	
			From	SO		DDE	SO	DDE
			To	DDE	DDE	SO	DDE	SO
				3.1.1	3.1.2	3.1.3	3.2.1	3.2.2
			Interaction	Regulation Signal	Dispatch Instruction	Real-Time Response	Deployment Instructions	Event Response
Element			Short Description					
9	20	Base Point	Per-interval dispatch instruction	M	M	O	M	
9	21	Breaker Status	Status of the Breaker for the Resource	M	M	O	M	O
9	22	Output MW	Real Power Output of the Generation Device	M	M	M	M	O
9	23	Output MVAR	Reactive Power Output of the Generation Device	M	M	O	M	O
9	24	DR Bus Load MW	Instantaneous Bus Load of a Demand Resource providing Ancillary Services	O	O	O	O	O
9	27	Set Point	Final dispatch target level	M	M	O	M	
10		Ancillary Service Market						
10	0	Ancillary Service Instruction ID		O	O			
10	10	Ancillary Service Product Type	Type of Ancillary Service product(s) the Resource is enrolling to provide	M	M	O		

			Process	3.0 Deployment & Real-Time Communications				
				3.1 Economic			3.2 Reliability	
			From	SO		DDE	SO	DDE
			To	DDE	DDE	SO	DDE	SO
				3.1.1	3.1.2	3.1.3	3.2.1	3.2.2
			Interaction	Regulation Signal	Dispatch Instruction	Real-Time Response	Deployment Instructions	Event Response
Element			Short Description					
10	12	Ancillary Service Award - Start Time	Start Time of the ancillary service Award		M			
10	13	Ancillary Service Award - End Time	End Time of the ancillary service Award		M			
10	14	Ancillary Service Award - Interval Start Time	Start Time of the ancillary service Interval within the ancillary service Award and the ancillary service Value of the Time Interval		M			
10	15	Ancillary Service Award - Interval Value	The awarded Value for the Time Interval within the ancillary service Award		M			
10	17	Ancillary Service Schedule ID		O	O			
10	31	Reserve Pickup Flag	Flag set if this is a Reserve Pickup schedule	O	O	O		
10	32	Regulation Base Point	Per-interval Regulation dispatch instruction	M	M	O		

			Process	3.0 Deployment & Real-Time Communications				
				3.1 Economic			3.2 Reliability	
			From	SO		DDE	SO	DDE
			To	DDE	DDE	SO	DDE	SO
				3.1.1	3.1.2	3.1.3	3.2.1	3.2.2
			Interaction	Regulation Signal	Dispatch Instruction	Real-Time Response	Deployment Instructions	Event Response
Element			Short Description					
10	33	Base Load MW	Level of Load at time of dispatch	O	O	O		M
12		Event and Performance						
12	10	Event ID	Identifier assigned to the Event				O	M
12	11	Deployment Type	Type of Deployment				M	
12	12	Event Day	Operating Date of Start of Event				M	M
12	13	Event Description	Description of the Event				M	O
12	14	Event Start Time	Time of Start of deployment period for Event				M	M
12	15	Operator Comment	Additional Event information provided by the Operator				O	O
12	16	Deployment MW	Absolute or relative Deployment quantity				M	
12	17	Event Status	Status of the Event				O	O

			Process	3.0 Deployment & Real-Time Communications				
				3.1 Economic			3.2 Reliability	
			From	SO		DDE	SO	DDE
			To	DDE	DDE	SO	DDE	SO
				3.1.1	3.1.2	3.1.3	3.2.1	3.2.2
			Interaction	Regulation Signal	Dispatch Instruction	Real-Time Response	Deployment Instructions	Event Response
Element			Short Description					
12	18	Event End Time	Time of End of deployment period				M	M
12	19	Event Modification Number	A modification number for the event.				O	O
12	111	Notification Acknowledgement	This is an acknowledgement of the receipt of a DR notification or dispatch. It should include any necessary provisions for non-repudiation.				O	O
12	112	Event Modification Reason Code	The reason the event is being cancelled or modified.				O	O
12	21	Baseline Dates	Dates of days used to calculate the Energy Baseline					O
12	22	Baseline Exclusion Dates	Dates of days Excluded from the calculation of the Energy Baseline					O
12	23	Energy Baseline Value	Calculated Energy Baseline					O
12	24	Energy Baseline Timestamp	Timestamp of Energy Baseline					O

			Process	3.0 Deployment & Real-Time Communications				
				3.1 Economic			3.2 Reliability	
			From	SO		DDE	SO	DDE
			To	DDE	DDE	SO	DDE	SO
			Interaction	3.1.1 Regulation Signal	3.1.2 Dispatch Instruction	3.1.3 Real-Time Response	3.2.1 Deployment Instructions	3.2.2 Event Response
Element			Short Description					
12	30	Reporting Interval	Interval size required for Reporting					O
12	31	Measurement Value Timestamp	The time when the value was last updated	O	O	M		M
12	32	Measurement Value	Value of the interval reading	O	O	M		M
12	33	Response Value	Response	O	O	O		O
12	991	Event & Performance comments	Comments associated with Event and Performance data				O	O

018-1.4.6 Measurement and Performance – Baseline

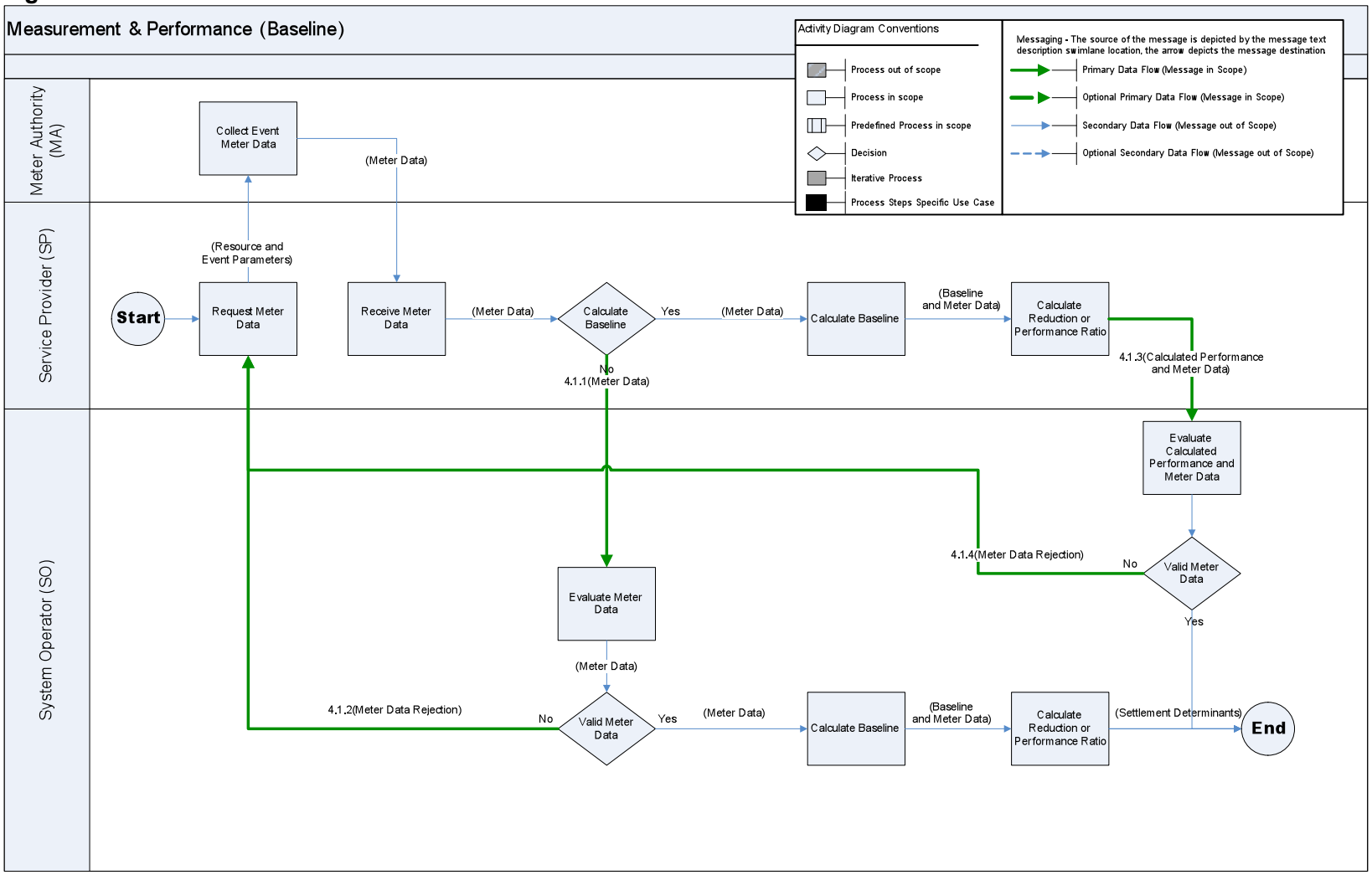
Overview: The Measurement and Performance process documents the steps to collect demand resource meter data and prepare the determinants for settlement.

Use Cases: All use cases where Baseline applies (see Figure 7).

- The process begins when the SP requests event meter data from the MA.
- The MA sends the event meter data to the SP.
- If the SP is required to calculate the baseline, the SP uses the event meter data to calculate the baseline.
  - The SP uses the baseline and event meter data to calculate the event reduction amount or event performance ratio.
  - The SP sends the calculated event performance and meter data to the SO.
  - The SO evaluates the calculated event performance and meter data.
    - If the calculated event performance data are complete, the SO uses the settlement determinants in the Settlements process.
    - If the calculated event performance data are incomplete, the SO sends an event data rejection to the SP.
- If the SO calculates the baseline, the SP sends the event meter data to the SO.
  - If the event meter data are complete, the SO uses the event meter data to calculate the baseline.
    - The SO uses the baseline and event meter data to calculate the event reduction amount or event performance ratio.
    - The SO uses the settlement determinants in the Settlements process.
  - If the event meter data are incomplete, the SO sends an event data rejection to the SP.

Activity Diagram and Data Flow:

Figure 7 - Measurement and Performance – Baseline



Note: Data elements for Measurement and Performance-Baseline are listed with Measurement and Performance-All Others in Table 12.

018-1.4.7 Measurement and Performance - All Others

Overview: The Measurement and Performance process documents the steps to collect demand resource meter data and prepare the determinants for settlement.

Use Cases: All use cases where Meter Before/Meter After, Maximum Base Load, or Meter Generator Output applies (see Figure 8).

- The process begins when the SP collects event meter data from the MA for the specified performance evaluation method.
  - If the performance evaluation method is Meter Before/Meter After or Maximum Base Load, the MA sends the event meter data to the SP.
  - If the performance evaluation method is Meter Generator Output, the SP uses the data from the meter on the generator.
- If the SP is required to calculate performance, the SP uses the event meter data to calculate performance.
  - The SP uses the meter data to calculate the event reduction amount or event performance ratio.
  - The SP sends the calculated event performance and meter data to the SO.
  - The SO evaluates the calculated event performance and meter data.
    - If the calculated event performance data are complete, the SO uses the settlement determinants in the Settlements process.
    - If the calculated event performance data are incomplete, the SO sends an event data rejection to the SP.
- If the SO calculates performance, the SP sends the meter data to the SO.
  - If the event meter data are complete, the SO uses the event meter data to calculate performance.
    - The SO uses the event meter data to calculate the event reduction amount or event performance ratio.
    - The SO uses the settlement determinants in the Settlements process.
  - If the event meter data are incomplete, the SO sends an event data rejection to the SP.

Activity Diagram and Data Flow:

Figure 8 - Measurement and Performance – All Others

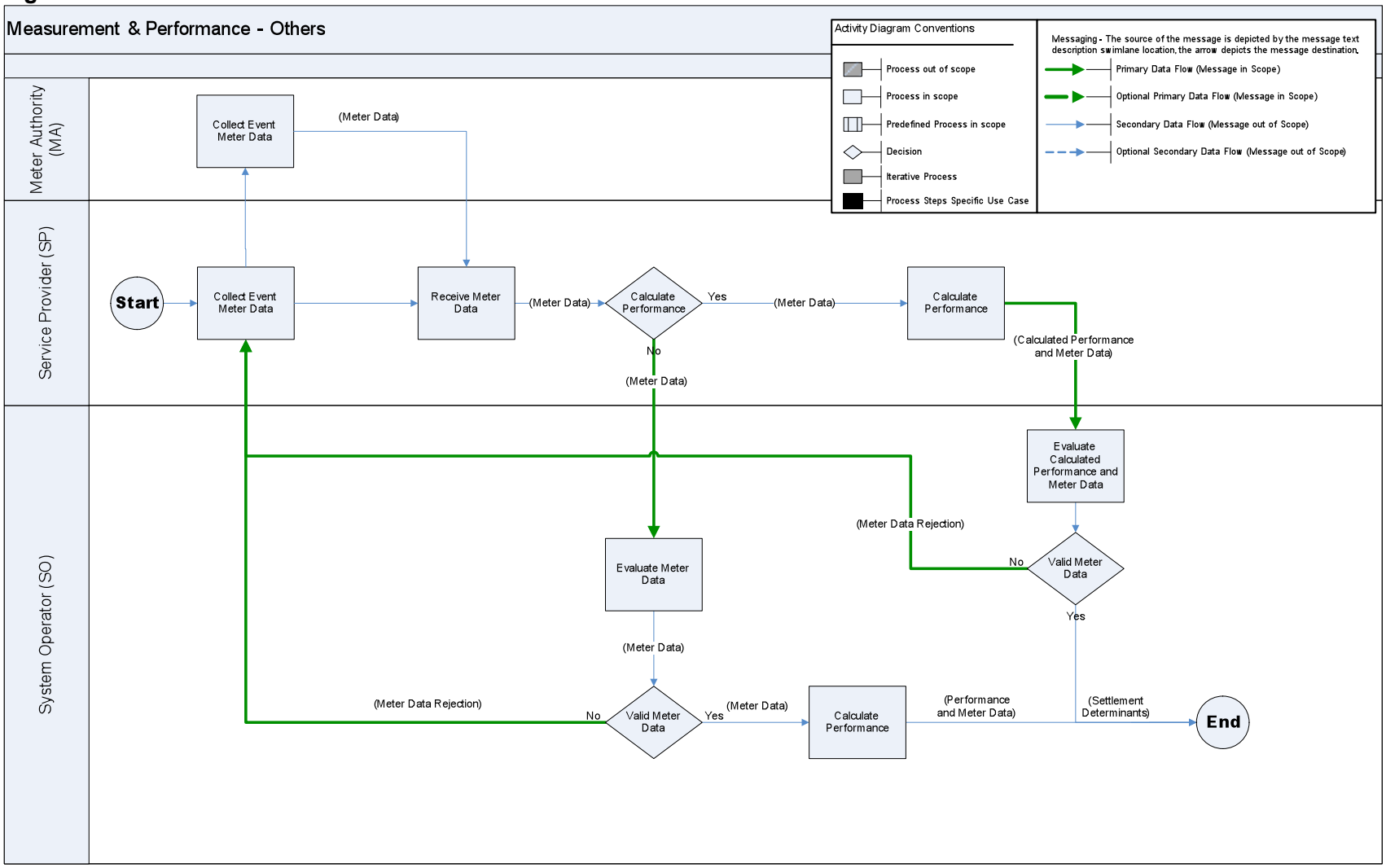


Table 12. Data Requirements by Interaction Number: Measurement and Performance

			Process	4.0 Measurement & Performance							
				4.1 Baseline				4.2 Other			
			From	SP	SO	SP	SO	SP	SO	SP	SO
			To	SO	SP	SO	SP	SO	SP	SO	SP
				4.1.1	4.1.2	4.1.3	4.1.4	4.2.1	4.2.2	4.2.3	4.2.4
			Interaction	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection
Element			Short Description								
0		Common									
0	10	Submittal Date	Timestamp for the sender's use	O	O	O	O	O	O	O	O
0	11	Submitted By	User ID of submitter	O	O	O	O	O	O	O	O
0	12	Submitted Error	ID of submission error detected	O	O	O	O	O	O	O	O
0	13	Rejection Code Type	Type of rejection message		M	O	M		M	O	M
0	14	Rejection Code Value	Code referring to the reason for a rejection message		M	O	M		M	O	M
0	20	NERC CIP Security - Availability	CIP Security Classification for Availability	M	M	M	M	M	M	M	M
0	21	NERC CIP Security - Confidentiality	CIP Security Classification for Confidentiality	M	M	M	M	M	M	M	M
0	22	NERC CIP Security - Integrity	CIP Security Classification for Integrity	M	M	M	M	M	M	M	M

			Process	4.0 Measurement & Performance							
				4.1 Baseline				4.2 Other			
			From	SP	SO	SP	SO	SP	SO	SP	SO
			To	SO	SP	SO	SP	SO	SP	SO	SP
			Interaction	4.1.1	4.1.2	4.1.3	4.1.4	4.2.1	4.2.2	4.2.3	4.2.4
				Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection
Element			Short Description								
1		General Asset/Resource									
1	10	Service Location ID	Identifier assigned to the Service Location	M	M	M	M	M	M	M	M
1	11	Service Location Name	Name of the Service Location	M	M	M	M	M	M	M	M
1	12	Asset ID	The unique identifier of the asset	O	O	O	O	O	O	O	O
1	13	Asset Name	The name of the asset	O	O	O	O	O	O	O	O
1	20	Resource ID	Identifier assigned to the Resource	M	M	M	M	M	M	M	M
1	21	Resource Name	Name of the Resource	M	O	O	O	O	O	O	O
1	30	Asset Group ID	The identifier of a group of assets	M	M	M	M	M	M	M	M
1	31	Asset Group Name	Name of the aggregated group of assets	O	O	O	O	O	O	O	O
2		Location									

			Process	4.0 Measurement & Performance							
				4.1 Baseline				4.2 Other			
			From	SP	SO	SP	SO	SP	SO	SP	SO
			To	SO	SP	SO	SP	SO	SP	SO	SP
				4.1.1	4.1.2	4.1.3	4.1.4	4.2.1	4.2.2	4.2.3	4.2.4
			Interaction	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection
Element			Short Description								
2	30	Zone ID	Identifier assigned to the Zone in which the Service Location is located	M	M	M	M	M	M	M	M
2	31	Zone	Name of the Zone in which the Service Location is located	O	O	O	O	O	O	O	O
2	32	Zone Type	Type of Zone	O	O	O	O	O	O	O	O
2	40	Electrical Node ID	Identifier assigned to the Electrical Node at which the Service Location is connected	O	M	M	M	O	M	M	M
2	41	Electrical Node Name	Name of the Electrical Node at which the Service Location is connected	O	O	O	O	O	O	O	O
2	42	Electrical Node Type	Type of Electrical Node at which the Service Location is attached	O				O			

			Process	4.0 Measurement & Performance							
				4.1 Baseline				4.2 Other			
			From	SP	SO	SP	SO	SP	SO	SP	SO
			To	SO	SP	SO	SP	SO	SP	SO	SP
			Interaction	4.1.1 Meter Data	4.1.2 Meter Data Rejection	4.1.3 Calc. Perf. and Meter Data	4.1.4 Meter Data Rejection	4.2.1 Meter Data	4.2.2 Meter Data Rejection	4.2.3 Calc. Perf. and Meter Data	4.2.4 Meter Data Rejection
Element			Short Description								
2	43	PNode	Name of the Price Node associated with the Service Location	O				O			
2	44	PNode ID	Identifier assigned to the Price Node associated with the Service Location	O				O			
4		Grid Connection									
4	10	Loss Factor Type	Type of Loss Factor			M				M	
4	11	Loss Factor Value	Loss Factor			M				M	
5		Business Entity Relationships									
5	11	Service Provider ID	Identifier assigned to the Service Provider	O	O	O	O	O	O	O	O
5	12	Service Provider Name	Name of the Service Provider	O	O	O	O	O	O	O	O
5	20	Transmission/Distribution Service Provider ID	Identifier assigned to the Transmission/Distribution Service Provider	O	O			O	O		

			Process	4.0 Measurement & Performance							
				4.1 Baseline				4.2 Other			
			From	SP	SO	SP	SO	SP	SO	SP	SO
			To	SO	SP	SO	SP	SO	SP	SO	SP
				4.1.1	4.1.2	4.1.3	4.1.4	4.2.1	4.2.2	4.2.3	4.2.4
			Interaction	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection
Element			Short Description								
5	21	Transmission/Distribution Service Provider Name	Name of the Transmission/Distribution Service Provider	O	O			O	O		
5	22	Transmission/Distribution Service Provider Account Number	Transmission/Distribution Service Provider's account number for the Resource	O	O			O	O		
5	44	Retail Rate	Retail Rate			O				O	
5	60	Meter Authority ID	Identifier assigned to the Metering Authority	O	O	O	O	O	O	O	O
5	61	Meter Authority Name	Name of the Metering Authority	O	O	O	O	O	O	O	O
5	70	Scheduling Entity ID	Identifier assigned to the Scheduling Entity	M	O	O	O	O	O	O	O
5	71	Scheduling Entity Name	Name of the Scheduling Entity	O	O	O	O	O	O	O	O
5	80	Designated Dispatch Entity ID	Identifier assigned to the Designated Dispatch Entity	M	O	O	O	O	O	O	O

			Process	4.0 Measurement & Performance							
				4.1 Baseline				4.2 Other			
			From	SP	SO	SP	SO	SP	SO	SP	SO
			To	SO	SP	SO	SP	SO	SP	SO	SP
				4.1.1	4.1.2	4.1.3	4.1.4	4.2.1	4.2.2	4.2.3	4.2.4
			Interaction	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection
		Element	Short Description								
5	81	**Designated Dispatch Entity Name**	Name of the Designated Dispatch Entity	O	O	O	O	O	O	O	O
6		**Device and Qualification**									
6	20	**Meter ID**	Identifier assigned to the Meter	M	M	M	M	M	M	M	M
6	2293	**Measurement Interval**	Interval of time between Measurement readings	O				O			
6	45	**Breaker Status During Event**	Status of the Breaker for the Service Location during an Emergency Event	O	O	O	O	O	O	O	O
6	46	**Wholesale Delivery Point Status**	Flag set if the Service Location is metered at the Wholesale level	O	O	O	O	O	O	O	O
6	47	**Private Use Network**	Flag set if the Resource is an Electric Network connected to the transmission grid	O	O	O	O	O	O	O	O
6	51	**UFR Settings**	Setting of the Under-Frequency Relay	O	O	O	O	O	O	O	O

			Process	4.0 Measurement & Performance							
				4.1 Baseline				4.2 Other			
			From	SP	SO	SP	SO	SP	SO	SP	SO
			To	SO	SP	SO	SP	SO	SP	SO	SP
				4.1.1	4.1.2	4.1.3	4.1.4	4.2.1	4.2.2	4.2.3	4.2.4
			Interaction	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection
Element			Short Description								
6	52	Load Resource Control Device	Type of Control Device at a Service Location or deployed by a Response Method	O	O	O	O	O	O	O	O
7		Market/Program Enrollment									
7	10	Program ID	Program Identifier	O	O	O	O	O	O	O	O
7	11	Program Name	Name of the Program	O	O	O	O	O	O	O	O
7	12	Market	Type of wholesale market	O	O	O	O	O	O	O	O
7	13	Market Product	Market Product	O	O	O	O	O	O	O	O
7	40	Response Method Type	Type of Response Method			O				O	
7	41	Response Method ID	Identifier assigned to the Response Method			O				O	
7	42	Response Method Name	Name of the Response Method			O				O	
7	51	Performance Evaluation Method	Method used to Evaluate the Performance of a Resource			O				O	

			Process	4.0 Measurement & Performance							
				4.1 Baseline				4.2 Other			
			From	SP	SO	SP	SO	SP	SO	SP	SO
			To	SO	SP	SO	SP	SO	SP	SO	SP
				4.1.1	4.1.2	4.1.3	4.1.4	4.2.1	4.2.2	4.2.3	4.2.4
			Interaction	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection
Element			Short Description								
7	991	Market Enrollment Comments	Comments associated with the Enrollment		O		O		O		O
11		Capacity Market									
11	30	Capacity Obligation Period Type	Type of Capacity Obligation Time Period within which the Resource is obligated	O	O	O	O	O	O	O	O
11	31	Capacity Obligation Period	Period of time for which the Capacity Resource is obligated	O	O	O	O	O	O	O	O
11	40	Minimum Payment Nomination	Strike price for the economic dispatch of the energy component of the capacity program			O				O	
11	41	Capacity Supply Obligation	Capacity Obligation			O				O	
11	50	Capacity Reference ID	Identifier assigned to the External System award			O				O	
11	991	Capacity Comments	Comments associated with the Capacity market			O				O	

			Process	4.0 Measurement & Performance							
				4.1 Baseline				4.2 Other			
			From	SP	SO	SP	SO	SP	SO	SP	SO
			To	SO	SP	SO	SP	SO	SP	SO	SP
			Interaction	4.1.1 Meter Data	4.1.2 Meter Data Rejection	4.1.3 Calc. Perf. and Meter Data	4.1.4 Meter Data Rejection	4.2.1 Meter Data	4.2.2 Meter Data Rejection	4.2.3 Calc. Perf. and Meter Data	4.2.4 Meter Data Rejection
Element			Short Description								
12		**Event and Performance**									
12	**10**	**Event ID**	Identifier assigned to the Event	M	M	O	M	M	M	O	M
12	**11**	**Deployment Type**	Type of Deployment			O				O	
12	**12**	**Event Day**	Operating Date of Start of Event			M				M	
12	**14**	**Event Start Time**	Time of Start of deployment period for Event	O	O	M	O	O	O	M	O
12	**16**	**Deployment MW**	Absolute or relative Deployment quantity			O				O	
12	**17**	**Event Status**	Status of the Event			O				O	
12	**18**	**Event End Time**	Time of End of deployment period	O	O	M	O	O	O	M	O
12	**21**	**Baseline Dates**	Dates of days used to calculate the Energy Baseline	O	O	O	O	O	O	O	O

			Process	4.0 Measurement & Performance							
				4.1 Baseline				4.2 Other			
			From	SP	SO	SP	SO	SP	SO	SP	SO
			To	SO	SP	SO	SP	SO	SP	SO	SP
				4.1.1	4.1.2	4.1.3	4.1.4	4.2.1	4.2.2	4.2.3	4.2.4
			Interaction	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection	Meter Data	Meter Data Rejection	Calc. Perf. and Meter Data	Meter Data Rejection
Element			Short Description								
12	22	Baseline Exclusion Dates	Dates of days Excluded from the calculation of the Energy Baseline	O	O	O	O	O	O	O	O
12	23	Energy Baseline Value	Calculated Energy Baseline	O	O	O	O	O	O	O	O
12	24	Energy Baseline Timestamp	Timestamp of Energy Baseline	O	O	O	O	O	O	O	O
12	30	Reporting Interval	Interval size required for Reporting	O	O	O	O	O	O	O	O
12	31	Measurement Value Timestamp	The time when the value was last updated	M	M	M	O	M	O	M	O
12	32	Measurement Value	Value of the interval reading	M	M	M	O	M	O	M	O
12	33	Response Value	Response	O	O	O	O	O	O	O	O
12	991	Event & Performance comments	Comments associated with Event and Performance data		O	O	O		O	O	O

018-A Appendix A – Entity-Relationship Model

The following terms and definitions correspond to a set of actor and objects within the overall information model for demand response. Figure 1A contains a data model used to illustrate the entity-relationships within the model. Abbreviations/Acronyms correspond to the IDs shown in the figure.

Proper (and Improper) Usage of the Entity-Relationship Model. The entity-relationship model is used to show cardinality among objects in the model, for example every Resource belongs to one and only one Service Provider and a Premise contains one or more End Devices. The entity-relationship model does not provide use case information; actors are objects in the model and do not "act" in the model. The entity-relationship model does not imply process. For example, a Service Provider is associated with many Resources; however the enrollment of those Resources may be managed by a System Operators or a Utility Distribution Operator. Both use cases and process maps are separate components of the Business Practice Standards.

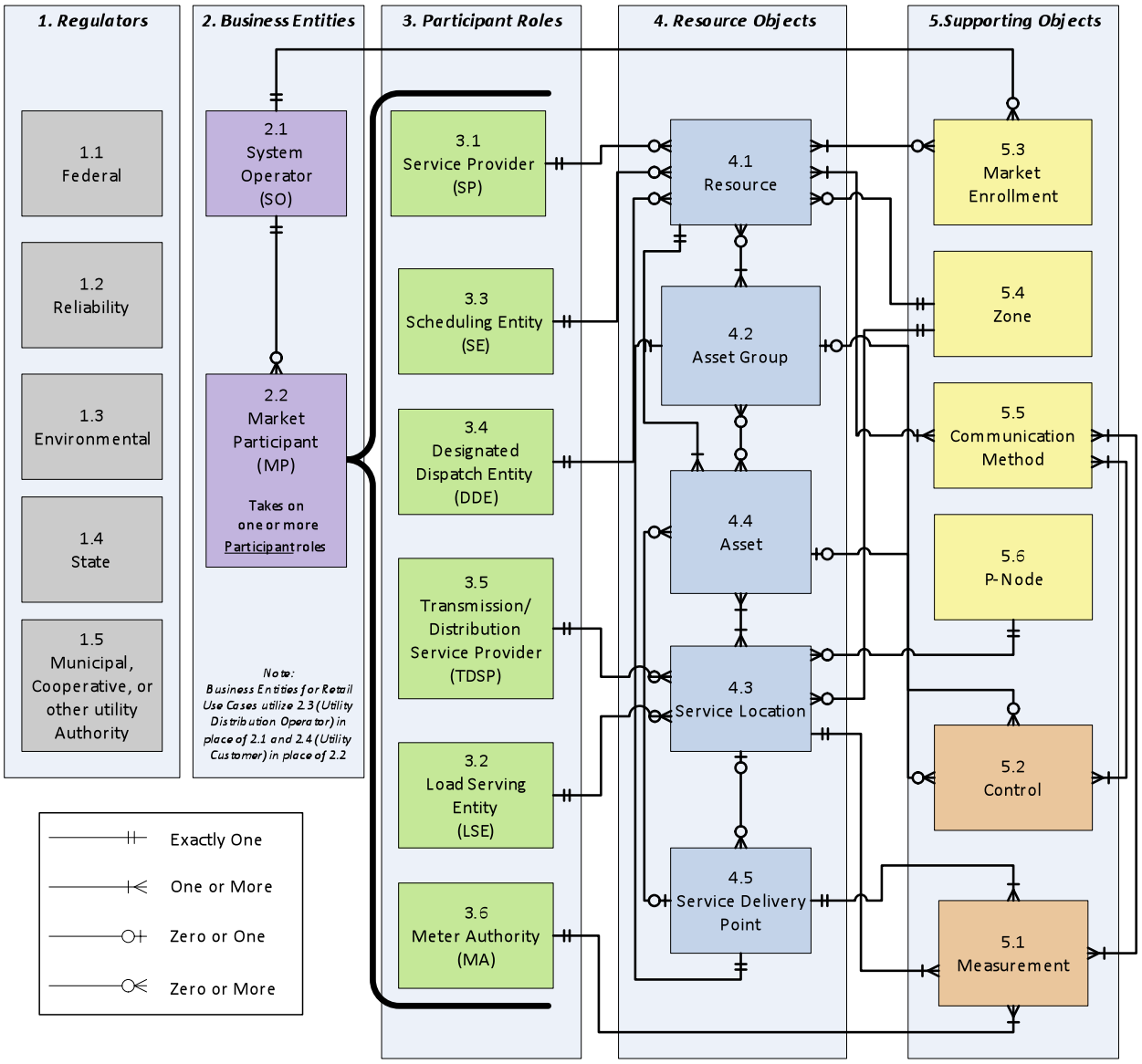
Reading Crow's Foot Notation. Objects in the model which share a relationship are connected with a cardinality line. Each end of the cardinality line contains a Crow's Foot notation, as documented in the legend of the figure. The four notations utilized are "exactly-one", "one-or-more", "zero-or-one", and "zero-or-more". The cardinality line is bi-directional; meaning it can be read in two directions. For example: a Premise is related to one-or-more End Devices (reading top to bottom) and every End Device is related to exactly-one Premise (reading bottom to top).

Optional Objects. The entity-relationship model is designed to support multiple business models and not every business model will require all objects to function. Therefore, all objects in the model are considered optional. For example, a Utility Distribution Operator may design a Demand Response program which requires the definition of Resources and Premises, but does not require Response Method Aggregations and Response Methods. In this example, the relationship between Resource and Premise is transitive: a Resource is comprised of one-or-more Premises and each Premise is associated with zero-or-more Resources.

Applicability to Retail and Wholesale. The entity-relationship model is applicable to both wholesale and retail. When using the model for wholesale, the applicable business entities are 2.1 (System Operator) and 2.3 (Market Participant), while in retail markets, the parallel business entities are 2.3 (Utility Distribution Operator) and 2.4 (Utility Customers). Other than the swapping of the two pairs of terms, the models are identical, including the names of and relationships among objects.

Figure 1A. Entity-Relationship Model for Smart Grid Use Cases

Proposed final version of diagram



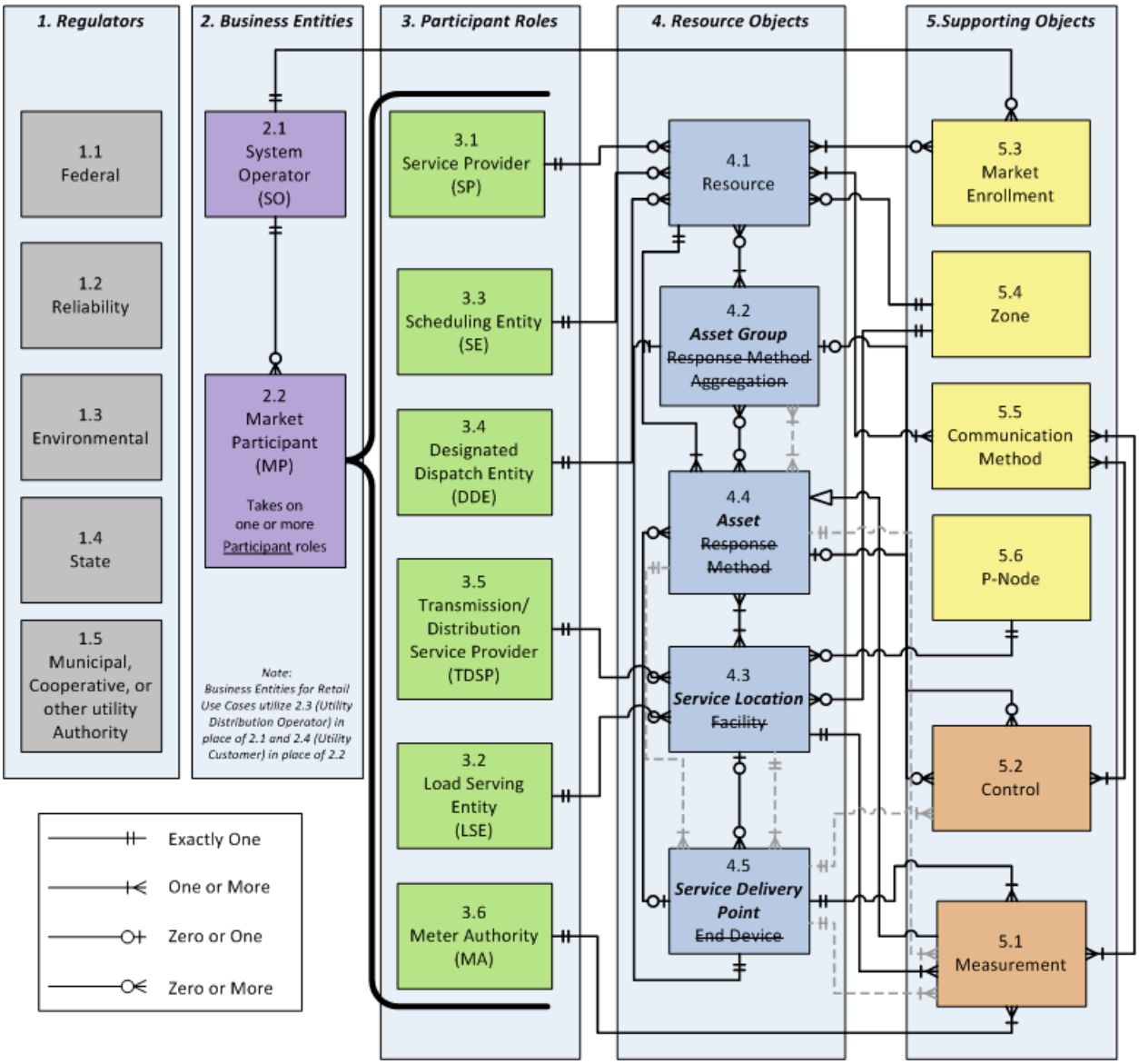
RECOMMENDATION TO NAESB EXECUTIVE COMMITTEE

For Quadrant:	**Wholesale Electric Quadrant (WEQ)**
Requesters:	**NAESB Smart Grid Task Force (SGTF)**
Request No.:	**2010 WEQ Annual Plan Item 6(c)(ii)**
Request Title:	**Phase Two Requirements Specifications for Wholesale Standard DR Signals - for NIST PAP09**

Version of diagram showing changes

Gray dashed lines: removed from new version

Strikeout text: renamed objects



018-B

Appendix B – Use Case Combinations

The following table is a complete list of use case combinations included in these Business Practice Standards.

Use Case	Product	Deployment	Performance Evaluation
E-B-1	Energy (Economic)	Bulk	Baseline
E-B-2	Energy (Economic)	Bulk	MB/MA
E-B-3	Energy (Economic)	Bulk	MBL
E-B-4	Energy (Economic)	Bulk	MGO
E-R-1	Energy (Economic)	Resource	Baseline
E-R-2	Energy (Economic)	Resource	MB/MA
E-R-3	Energy (Economic)	Resource	MBL
E-R-4	Energy (Economic)	Resource	MGO
E-S-1	Energy (Economic)	Self	Baseline
E-S-2	Energy (Economic)	Self	MB/MA
E-S-3	Energy (Economic)	Self	MBL
E-S-4	Energy (Economic)	Self	MGO
R-B-1	Energy (Reliability)	Bulk	Baseline
R-B-2	Energy (Reliability)	Bulk	MB/MA
R-B-3	Energy (Reliability)	Bulk	MBL
R-B-4	Energy (Reliability)	Bulk	MGO
R-R-1	Energy (Reliability)	Resource	Baseline
R-R-2	Energy (Reliability)	Resource	MB/MA
R-R-3	Energy (Reliability)	Resource	MBL
R-R-4	Energy (Reliability)	Resource	MGO
R-S-1	Energy (Reliability)	Self	Baseline
R-S-2	Energy (Reliability)	Self	MB/MA
R-S-3	Energy (Reliability)	Self	MBL
R-S-4	Energy (Reliability)	Self	MGO

Use Case	Product	Deployment	Performance Evaluation
C-B-1	Capacity	Bulk	Baseline
C-B-2	Capacity	Bulk	MB/MA
C-B-3	Capacity	Bulk	MBL
C-B-4	Capacity	Bulk	MGO
C-R-1	Capacity	Resource	Baseline
C-R-2	Capacity	Resource	MB/MA
C-R-3	Capacity	Resource	MBL
C-R-4	Capacity	Resource	MGO
C-S-1	Capacity	Self	Baseline
C-S-2	Capacity	Self	MB/MA
C-S-3	Capacity	Self	MBL
C-S-4	Capacity	Self	MGO
G-B-1	Regulation	Bulk	Baseline
G-B-2	Regulation	Bulk	MB/MA
G-B-3	Regulation	Bulk	MBL
G-B-4	Regulation	Bulk	MGO
G-R-1	Regulation	Resource	Baseline
G-R-2	Regulation	Resource	MB/MA
G-R-3	Regulation	Resource	MBL
G-R-4	Regulation	Resource	MGO
G-S-1	Regulation	Self	Baseline
G-S-2	Regulation	Self	MB/MA
G-S-3	Regulation	Self	MBL
G-S-4	Regulation	Self	MGO
V-B-1	Reserve	Bulk	Baseline
V-B-2	Reserve	Bulk	MB/MA
V-B-3	Reserve	Bulk	MBL
V-B-4	Reserve	Bulk	MGO
V-R-1	Reserve	Resource	Baseline
V-R-2	Reserve	Resource	MB/MA
V-R-3	Reserve	Resource	MBL
V-R-4	Reserve	Resource	MGO
V-S-1	Reserve	Self	Baseline
V-S-2	Reserve	Self	MB/MA
V-S-3	Reserve	Self	MBL
V-S-4	Reserve	Self	MGO

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Request No.:	**2010 WEQ Annual Plan Item 6(c)(ii)**
Request Title:	**Phase Two Requirements Specifications for Wholesale Standard DR Signals - for NIST PAP09**

4. Supporting Documentation

a. Description of Request:

WEQ Annual Plan Item 6(c) (ii) – "Develop Requirements and Use Cases for PAP 09 – Demand Response/Distributed Energy Resources" – Phase Two.

b. Description of Recommendation:

This recommendation associates the data elements to the use cases developed during the Phase One effort.

c. Business Purpose:

This recommendation has been developed in response to a request to include a Phase two effort for PAP-09 to associate data elements with the use cases developed in Phase 1 for standard DR and DER signals. Additionally, the recommendation addresses the directive from the WEQ Executive Committee for "the Smart Grid Standards Subcommittee to review the Executive Summary and Introduction to reconsider language that may not be appropriate for business practices long-term in their Phase 2 work."

d. Commentary/Rationale of Subcommittee(s)/Task Force(s):

NAESB Smart Grid Standards Subcommittee Meeting Notes/Documents:

- June 10, 2010 Meeting Notes – To be posted
- June 17, 2010 Meeting Notes – http://www.naesb.org/pdf4/smart_grid_ssd061710notes.doc
- July 1, 2010 Meeting Notes – To be posted
- July 13-14, 2010 Meeting Notes – To be posted
- July 22, 2010 Meeting Notes – To be posted
- August 5, 2010 Meeting Notes – http://www.naesb.org/pdf4/smart_grid_ssd080510notes.doc
- August 12, 2010 Meeting Notes – http://www.naesb.org/pdf4/smart_grid_ssd081210notes.doc
- August 26, 2010 Meeting Notes – http://www.naesb.org/pdf4/smart_grid_ssd082610notes.doc
- September 9, 2010 Meeting Notes – http://www.naesb.org/pdf4/smart_grid_ssd090910notes.doc
- September 16, 2010 Meeting Notes – http://www.naesb.org/pdf4/smart_grid_ssd091610notes.doc
- September 23, 2010 Meeting Notes – To be posted
- October 7, 2010 Meeting Notes – To be posted

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